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AN ANALYSIS OF LOGISTICS
FOR
THE UNHCR PROGRAMME OF EMERGENCY ASSISTANCE
FOR UGANDAN RETURNEES FROM SUDAN AND UPPER ZAIRE

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by

INTERTECT
BOX 10502
DALLAS, TEXAS 75207

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I.
GENERAL IMPRESSIONS

The following is a summary of the overall impressions of the assessment mission.

Administration

It is the opinion of the consultants that the existing staff in the Branch Office, the Sub-Office and the various field offices of UNHCR in Uganda are doing an excellent job. We were impressed by the level of preparedness activities that have taken place, the level of planning that has been carried out and the understanding of each of the individuals involved of their particular roles in the activities that may be required in the near future.

The consultants were especially impressed with the organization and personnel of the Sub-Office in Arua. The Head of the Sub-Office is an experienced and knowledgeable leader and has done a remarkable degree of advance planning for the expected influx of returnees. The two field officers -- one based in Moyo, the other in Adjumani -- while new to the area, are both experienced personnel with a good grasp of the field issues.

The leadership and staff in Kampala also appear to be well prepared and highly motivated to deal with the situation. While minor problems exist in the flow of information between the field and various persons in the branch office, recent changes in the administrative structure and table of organization of the emergency program should alleviate these problems. The program officers and logistics coordinator in Kampala are experienced and well-trained personnel who understand their roles and responsibilities fully and can be expected to do an excellent job in a crisis situation.

The principal weaknesses currently found in administration are:

1. Poor office facilities.
2. Poor inter-office organization of administrative functions.
3. Inadequate administrative support in the field areas.

Of these, the last should be partly remedied by the assignment of administrative personnel from Geneva to the Sub-Office in the immediate future.

Level of Preparedness

Facilities -- The consultants were very impressed with the level of preparedness activities currently underway in all project areas. The implementing partner, LWF, has done an excellent job of preparing reception facilities by rehabilitating existing buildings to be warehouses and reception centers. If the program operates according to expectations, there should be no problems in servicing returnees and providing assistance through the RCs.

Sanitation facilities are the one deficiency noted. Should the returnees have to remain in the reception centers for longer than 24 hours, sanitation could become a problem. Therefore, it is recommended that the number of latrines be increased at each of the RCs.

Food and Material Assistance -- The stockpiling of food and material assistance and the establishment of sufficient buffer stocks to take care of an unexpected influx has not been achieved due to logistics delays; however, this should not be a reflection on the program staff, as personnel at all levels have worked diligently to speed the supply operation and establish the necessary level of stocks. If the recommended improvements to the overall logistics system can be implemented (see Section II), it should be possible to ensure that adequate food supplies reach the area in time to be distributed to the returnees.

Warehousing procedures, especially segregation and stacking of food supplies, require additional attention. It is recommended that an experienced warehouse technician be recruited to establish and demonstrate proper warehouse management to the Reception Center and warehouse staff. As an interim measure, the attached materials on warehouse management could be reproduced and distributed. (See Appendix A.)

Early Warning Indicators -- The Branch Office has established as a reference mark that, when 5,000 returnees enter Uganda in any one-month period, emergency procedures will go into effect. Given the advanced notice that is likely to be available from the Sub-Office and Field Officers in southern Sudan, this indicator appears to be valid and a workable index for normal repatriation in the existing situation. However, given the chance that a large number of Ugandans might be displaced by armed conflict from the southern Sudan region, it is recommended that any doubling of the population of returnees in a one-month period be established as an indicator of a potential mass influx caused by "push" factors in southern Sudan.

II LOGISTICS ANALYSIS

The logistics system for this project can be divided into three separate stages: the first stage is from procurement to delivery in-country (normally Kampala), the second stage is the delivery of the commodity from Kampala to the project area, and the third stage is the delivery of the commodities from forward warehouses to the returnees via the distribution system. The scope of this consultancy was to analyze second and third stage logistics only.

Second Stage Logistics Movements

Figure 1 depicts the overall logistics system and various transfer points. At present, lorries are contracted (either by WFP or UNHCR) from private trucking companies. (Supplies may be originally loaded at Mombasa, Nairobi, Jinja or Kampala, depending on the type of food or materials being procured. However, delivery problems do not begin until supplies actually leave Kampala northward).

Upon departing Kampala, the trucks move north via Bombo, through Lowero to Masindi. Once in Masindi the trucks are marshalled into a convoy and provided a military escort. Once the escort is assembled, they move along the Kabalega road to the ferry crossing at Paraa, cross on the ferry, and reassemble on the north side of the Victoria Nile. They are then escorted onward through the Kabelega Falls National Park to Pakwach. Due to lack of effective control of this area by the NRA of this area, road maintenance has deteriorated and a number of trucks have been mired in the mud on this track for several days at a time.

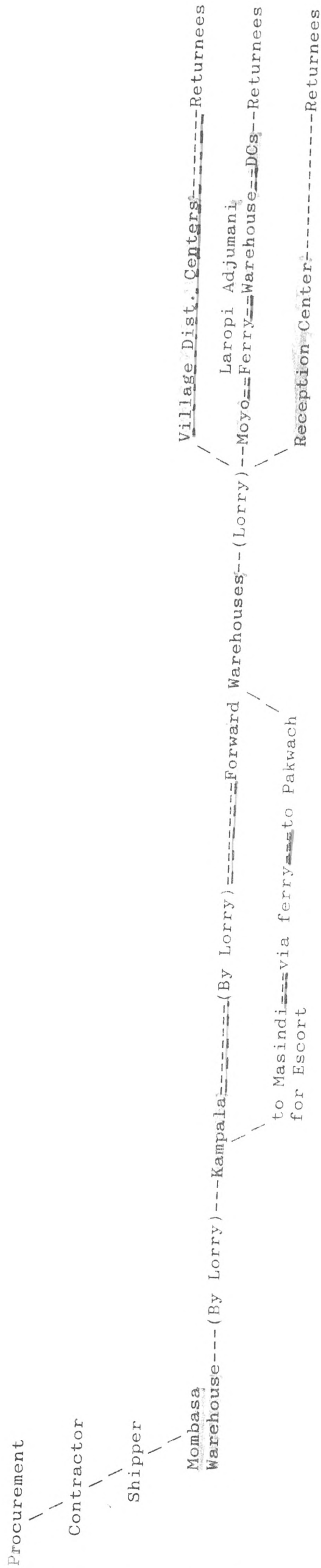
Periodically, the convoys are forced to stop due to guerrilla and bandit activity in the area. On reaching Pakwach, the escort leaves the convoy; the trucks proceed individually across the Albert Nile into the project area and from there to Arua and on to Moyo. The larger lorries stop at each of the distribution centers and discharge their cargoes. Cargoes bound for Adjumani and the portion of the province that lies on the northeast side of the Nile must be reloaded on smaller trucks and ferried across the river at Laropi.

The principal problem areas and causes of the problems are depicted on the map in Figure 2.

Potential Stoppages

The overall logistics situation is very tenuous. The most relevant logistics problems occur in the shipment of food and materials from Kampala to the project area. Likely areas where the system could encounter stoppages are:

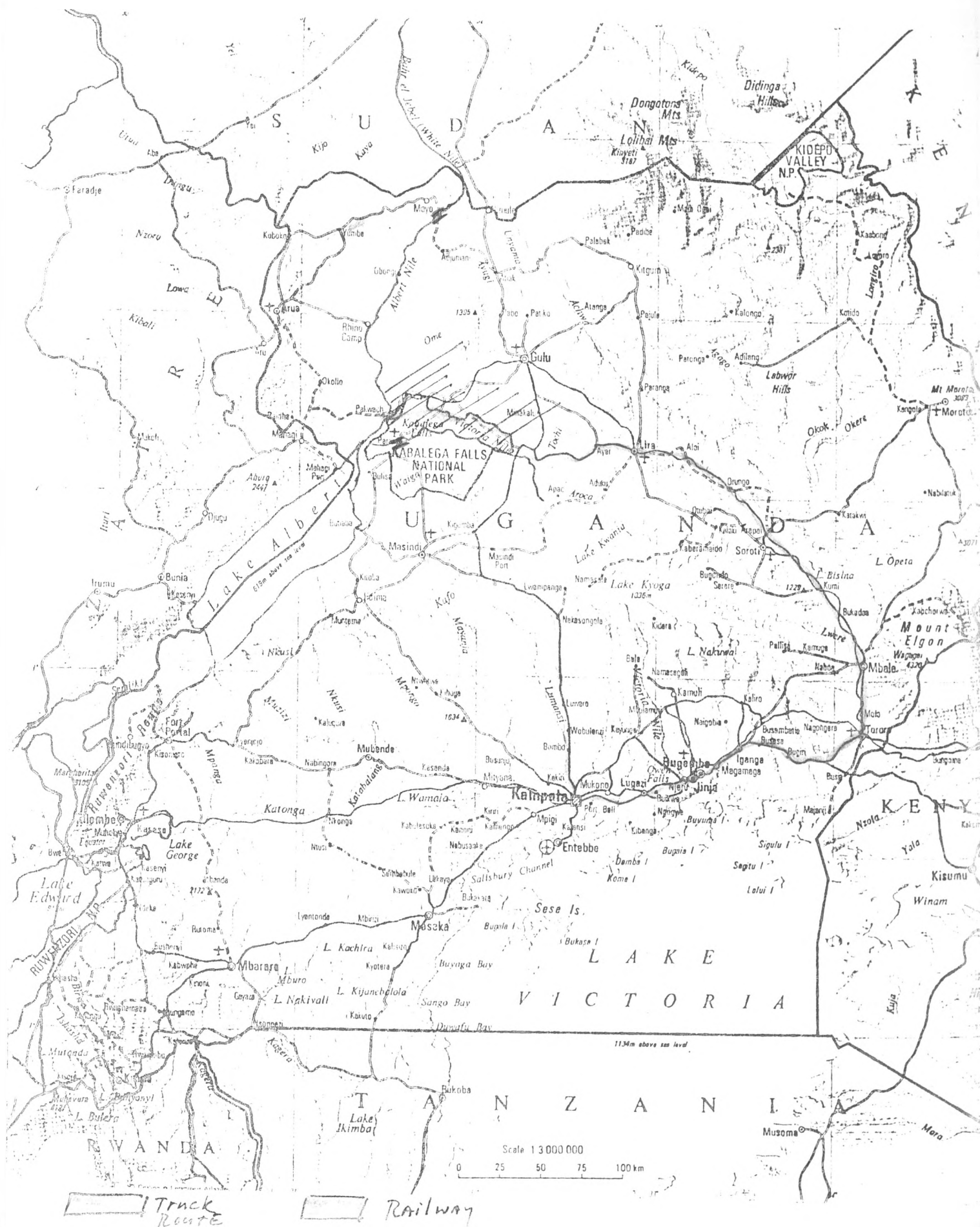
FIGURE 1
SCHEMATIC OF LOGISTICS SYSTEM



Transfer Points

Potential Problem Areas

Figure 2: Logistics Problem Areas



1. The ferries at Paraa and Laropi.
2. Organization of convoys and provision of military escort.
3. Continued availability of contract trucks.
4. Local distribution network of trucks.
5. Buggy areas on the road between Kasumi Falls and Pakwatch.

Alternative Transport

1. Railways -- An intact rail line runs from Uganda to Pakwatch (see map, Figure 2). At present, the trains do not proceed beyond Soroti, due to security problems in the northern sector. Discussions with rail officials indicate that it is uncertain when the railway might reopen. Adequate rolling stock, engines and fuel exist to move the necessary amounts of supplies should the rails be reopened. Given the current situation, however, this possibility does not appear likely within the next several months. (The Traffic Manager of the rail company indicated that he would be reluctant to send trains into the area even if the military reopened the route because it might "draw attention" of the UNLA forces and could lead to destruction of railway trestles and other facilities vital to the rail line.)

While one or two large shipments by train might be possible later in the project, program planners should not rely on using this resource. Furthermore, given the current problems and uncertainties of the trains, it would still be necessary to build a truck-based logistics system in the event that the trains would be stopped before adequate supplies could be moved into the project area. Furthermore, a portion of the system would require trucks to move supplies from the railhead at Pakwatch to the remainder of the project area.

2. Airlift -- One way to provide food supplies in an emergency would be through an airlift to Arua. The airstrip at Arua currently handles Fokker F-27 aircraft, but the width and length of the airstrip are adequate for operations of aircraft up to and including the size of C-130s. If an airlift were to be considered, it is recommended that a forward airbase such as Sirote or Masindi be used so that the distances involved would be relatively short. In other words, food and other supplies would be trucked to the forward areas and then "shuttled" across the contested areas to Arua. Due to the high costs of airlifting food however, this should only be considered as a last resort.

If an airlift is considered, the two-engine STOL cargo planes of the Kenyan Air Force, the C-7 Caribou, would be ideal aircraft for shuttling food supplies. Given the relatively

short distances involved, the Caribou should be able to shuttle approximately five tons every two hours into the project areas if operated from a forward airstrip. Since the planes would not have to carry large amounts of fuel, cargo loads would be increased and overall costs would be much less.

If the Kenyan Air Force is not willing to provide the aircraft, one C-160 Transall of the type operated by the French or German Air Forces could also be used and would provide approximately an 8-10 ton load-carrying capacity.

ICARA II Proposals

The Branch Office has reported that the UNDP has recommended utilizing ICARA II funds for the purchase of trucks and improvement of roads. Approximately \$200,000 to \$300,000 would be spent on the purchase of trucks, the balance on roads. The trucks would be operated under an agreement similar to that used by the Ethiopian WTOE (i.e., the trucks would be operated by a commercial operator or a para-statal organization under the direction of a supervisory board made up of representatives of the government, voluntary agencies, etc). At present, the Ministry of Planning agrees to the UNDP proposal, however, the Ministry of Rehabilitation is uncertain and has not given its concurrence.

Recommendations for Second Stage Logistics

1. Establish an alternate route to the project area.

The best way to ensure that food supplies reach the project area would be to develop an alternate route to West Nile Province. By rerouting the trucks around the region that is most problematic, the delays and the necessity for convoys could be avoided.

Several options appear feasible. They are:

Option I: Reposition the Paraa ferry. The Branch Office should request that the Ministry of Works reposition the ferry so that it could operate from Wanseko to Panimur. (See Map, Figure 3.) As recently as the early 1970s, a ferry operated between these two points, and the road between Masindi and Wanseko and those from Panimur to Arua are reported to be in sufficient shape to permit the passage of large trucks along these routes. By repositioning the ferry, the entire problem area around the National Park could be avoided. It is unlikely that the UNLA forces operating in the park area would try to cross the Victoria Nile to attack the convoys, since one of the largest battalions of the NRA is based at Masindi and guards the area. It would also be difficult for the UNLA to fire on the ferry during the crossing from Wanseko to Panimur due to the distances involved (over 6,000 meters from the nearest land point, and any troops on that point would be very exposed to the NRA).

The map illustrates the Lake Albert region, highlighting the recommended ferry crossing at Wanseko. Key geographical features include Lake Albert, Murchison Falls National Park, and the Bukumi-Bugungu Hunting Area. The map also shows various towns, reserves, and administrative boundaries. A scale bar on the right indicates distances up to 23.0 miles.

Figure 3: Recommended Ferry Crossing at Wanseko

MURCHISON
FALLS
NATIONAL
PARK

BUENA COUNTY
BUENA COUNTY

BUKUMI-BUGUNGU
HUNTING AREA

Option II: Rehabilitate the landing barge at Laropi and reposition it to Wanseko to serve as a ferry. There is a landing barge (used in the past as a ferry) currently tied-up on the West Bank of the Nile at the ferry landing at Laropi.

Preliminary inspection of the barge indicates that it could be made serviceable in short order and used as a ferry if the ferry on the Victoria Nile cannot be repositioned. In preparation for the rehabilitation of the ferry, the consultants visited a Marine Engineer, Mr. David Fox, in Mombasa who has agreed to visit the project area and survey the barge to determine if it can be made serviceable and how much the costs might be. (Resume provided to Africa Section for transmittal to Branch Office.)

Option III: Rehabilitate the second ferry at Laropi and reposition it to Wanseko. There is currently a ferry identical to the one now in service at Laropi, that could be rehabilitated and used in addition to the landing barge mentioned above or used as a ferry at the Wanseko crossing. However, this smaller ferry would only carry smaller trucks, thus requiring that the food being shipped north be put in smaller trucks (less than 15 tons). The marine engineer interviewed by the consultants (see Option II above) has also indicated that he would be willing to survey the second ferry at Laropi.

Option IV: Build a new ferry and place it on the Wanseko-Panimur crossing. If no other ferries are available, a new ferry could be constructed in sections in Mombasa, shipped to the Wanseko landing and assembled on site. The consultants visited with Mr. James D.F. Scougall, the Managing Director of African Marine and General Engineering Company Limited in Mombasa (address attached). Mr. Scougall said that it would take approximately one month to build the ferry in sections, move it to the area and assemble it for service. Mr. Scougall indicated that it would require some assistance from UNHCR to obtain the necessary permits to import the harbormaster engines required. However, they are available from Europe and can be delivered in short order. The total estimated cost of constructing and assembling the new ferry would be approximately \$100,000.00 US dollars.

Option V: Rehabilitate the Park Services launch and use it for shuttling food across the Wanseko-Panimur route. The Uganda Park Service has a small river launch that could be used to shuttle small amounts of food across the ferry route. The launch is currently out of service, but park personnel indicate that it could be rehabilitated. The total tonnage that could be moved at any one time would probably be small, so this option should be considered only in the event of a total breakdown of the convoy system.

Option VI: Establish a barge system. A number of lighters and motorized barges could be procured from the Kenya Harbor Authority at Mombasa. These could be used to move adequate supplies of food and other materials across the Wanseko route. However, given the fact that the barges are fairly large, transportation could be difficult and time consuming. However, as a last resort, a barge system could be considered.

2. Establish a backup food delivery system for emergencies.

In the event that all transportation to the north by surface, land or water were to be disrupted for a long period of time, an alternative food delivery system should be considered.

Option: Food purchasing in Zaire. The Head of Sub-Office Arua has indicated that a commercial agent operating from Aru, Zaire, could provide adequate short-term supplies of food from Aru. The consultants attempted to meet with this potential contractor, Mr. Pascal Munimpiua, but were unable to arrange a meeting during the time period of the consultancy. It is therefore recommended that the Field Office in Aru investigate the credentials of this person and determine whether or not, as a backup, Mr. Munimpiua could provide the necessary quantities of food and other supplies.

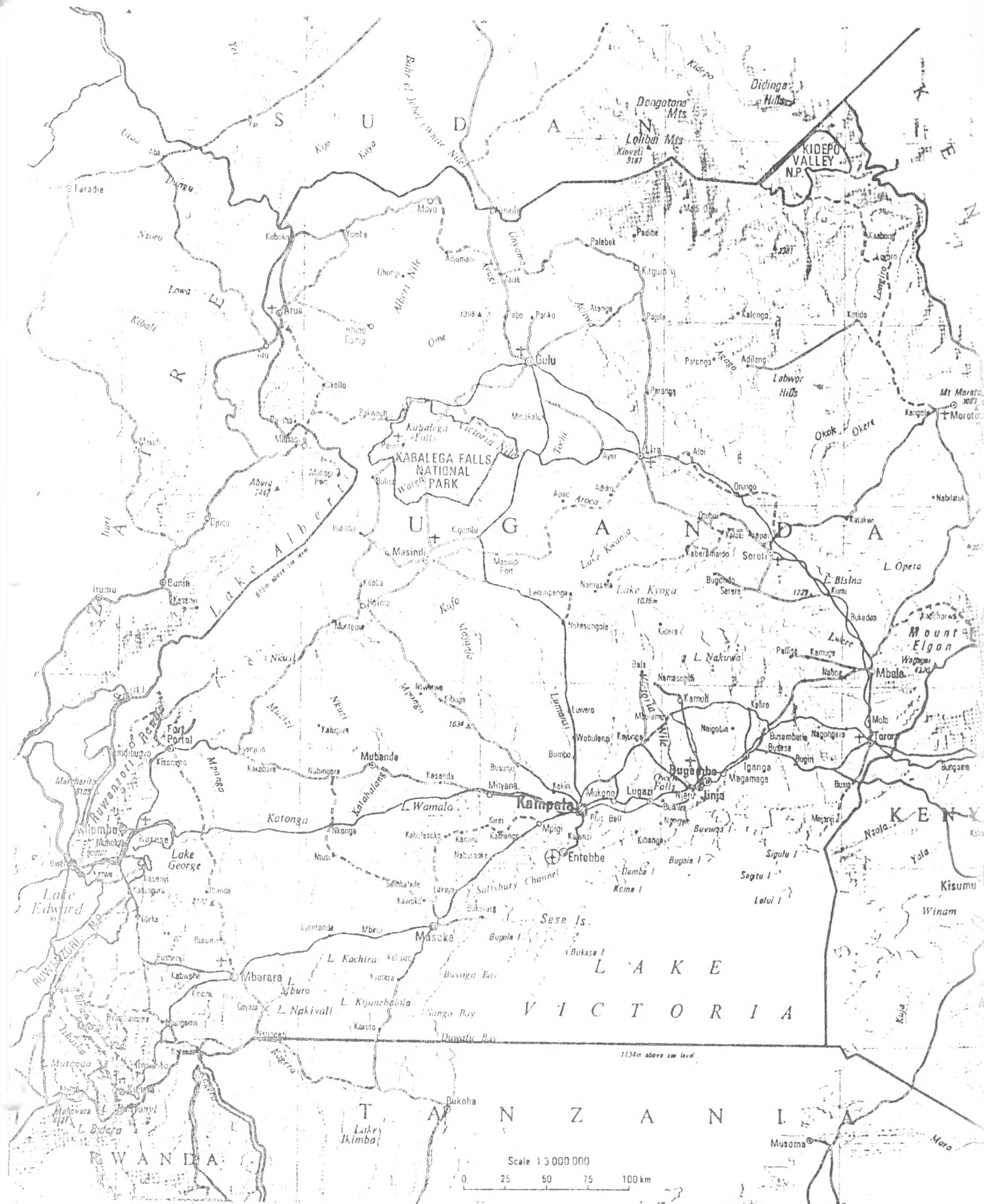
3. Explore the feasibility of rerouting convoys through Zaire.

In the event that all surface traffic to the north is disrupted, one possible way of moving food to the area would be to reroute convoys through Zaire (see Map, Figure 4). This option has been explored in the past and the Uganda Government has already indicated that it would prefer not to use this route. There are also reports that the roads from the western-most entry point at Bwera up to Aru are in a poor state of repair.

As a last resort, this route should be explored. It is recommended that a field officer from the Zaire Field Office in Aru make an exploratory journey from Aru to Bwera (via Djugu, Bunia, Irumu). At the same time, someone from Branch Office/Kampala should check the route from Kampala to Bwera. If the route appears to be feasible, HCR should undertake to secure permissions from the Governments of Uganda and Zaire to use this alternate route. If road improvements are necessary, an estimate of the required improvements and potential costs should be developed.

(It should also be pointed out that the railway between Kampala and Kilembe which is only a small distance from Bwera, is reported to be servicable.)

Figure 4: Alternate Route Via Zaire



4. Review and, if necessary, revise the overall logistics and distribution system controls.

To effectively manage the storage and distribution of commodities, a uniform system of record-keeping should be instituted and all storekeepers and logistics personnel trained in its use. It is important that such a system interfaces effectively with the transport documentation (WFP for Phase II transport, and HCR and LWF for Stage III distribution).

The overall paper-flow for controlling logistics (i.e., way bills, warehouse receipts, stock cards and ration cards) needs to be revised and integrated. At the present time, the system could easily be abused. The consultants recommended the following to the Branch Office:

- A. A stock card system for each location with a separate stock card for each commodity item (e.g., beans, oil, maize, etc.).

The stock cards should identify one cargo movement per line, recording:

- (i) Receiving waybill number, quantity and date;
- (ii) Dispatching waybill number, quantity and date;
- (iii) Current stock balance.

- B. Daily/weekly reporting summaries that include:

- (i) Daily receipt recaps
- (ii) Daily dispatch recaps

These movements should be reported daily by radios between Field Offices to the Sub-Office and summarized by:

- number of vehicles received/dispatched;
- Total goods received/dispatched.

These reports should be confined to movements of major commodities (food and fuel). Example:

"Moyo received 3 trucks with 450 90kg bags of Maize."

Or

"Moyo dispatched to Adjumani 2 trucks carrying 200 90kg bags of beans."

The Sub-Office should report daily by radio to the Branch Office a summary of vehicles and cargos received to relay to WFP.

In addition, each warehouse should maintain separate Receiving and Dispatching logs using one line for each movement. The log should record the following:

- Date
- Waybill number and origin
- Cargo (commodity, quantity and unit)
- Over/Short or Damaged (Receiving Log only)

Copies of these logs should be conveyed weekly to the Branch Office by weekly courier plane.

It is also recommended that the Branch Office obtain weekly dispatch summaries from WFP and convey them to the Sub-Office by courier.

By following this system, it should be possible to ensure that food can be tracked from the point of origin directly to the distribution system. (In addition, a review of the individual ration registration system should be conducted. See page 16.)

5. Improve warehouse management.

It is recommended that a warehouse management specialist be retained to establish a recordkeeping and stock control system for each warehouse and to train storekeepers in proper procedures for storing foods and other relief items, maintaining stock controls, and proper recordkeeping.

Stage III Logistics (Distribution System)

A principal concern of the consultants is the distribution system for food supplies once returnees have returned to their villages. As it now stands, the program can be classified as a "general village distribution program", i.e., food will be delivered to a village distribution committee organized by the Government of Uganda and subsequently given directly to the returnees based on a set amount of food allocated according to the number of family members (see Figure 5). A number of problems are likely to occur. Perhaps the following review of food distribution systems could provide some insight into potential problems.

Generally, there are two types of food distribution systems: direct and indirect systems. Direct distribution systems provide food directly to the family. Except in extreme famine situations, a key planning assumption should be that people will have access to other food sources. Therefore, food distribution is generally supplemental in nature. The strategy is to put enough food into the community to meet basic needs and to assume that a "natural" adjustment will take place when people sell or barter a portion of the food they have received. In village distribution systems, a primary concern is not to put too much food into the community because it might undercut food prices for those farmers who are producing enough surplus to sell or barter, yet to put sufficient food into the community so that no malnutrition occurs.

Figure 5

TABLE OF COMMODITIES TO BE DISTRIBUTED

<u>Food</u>	<u>Amount</u>	<u>Basis of Calc.</u>	<u>Ration</u>
Maize	500 grams	Per Day	12 Kilos/Person
Beans	60 grams	Per Day	3 Kilos/Person
Salt	5 grams	Per Day	150 Grams/Person

Foods in Usual Diet:

Cassava
Millet
Maize
Sorghum

Indirect food programs provide additional food to those groups most in need. The usual way is through food-for-work programs, cash-for-work, payment-in-kind programs (PIK), and other types of projects. Generally, indirect food programs are used to ensure that adequate food is available to both those in need and the community in general by providing an additional source of food outside the other food distribution network. Therefore, indirect programs are usually supplemental to the village distribution system (unless only small numbers of easily identifiable groups are short of food).

Two methods are now almost universally used for direct distribution. The first is the general village distribution method. In this system, food is taken to the village and distributed to everyone equally, based on the number of family members. The advantages of the program are:

- They are the easiest to plan (i.e., number of people times the food allocation).
- They are the simplest to administer (it is just a logistics exercise).

The disadvantages, however, are:

- There is no targeting of the neediest.
- It is the most expensive (it requires more food since everyone is eating an equal allocation, and more transport is required since more food is needed).
- It is more prone to inequitable distribution (however, it is easy to detect).
- Food aid may become a disincentive to recovery, especially if people do have access to additional sources of food and end up selling the portion of the distributed food that they do not need.
- Food aid may undercut local prices that producing farmers are able to obtain for their harvests.
- It may be very difficult to reduce food rations at the village level once they have been initiated for periods of over three or four months, and such cut-offs may be disruptive.

The second distribution method is called a nutrition-based distribution system. The nutrition-based system is the one generally preferred by relief agencies, and much experience has been gained in Ethiopia and western Sudan during the recent famine in those countries. In this system, a parent brings the thinnest child to the distribution center once a month. There the child is weighed and measured. Then, based on interpre-

tation of that information, the family receives an allocation of food. Initial admission criteria are usually established using arm circumference measurements (which tend to err on the side of qualifying more people than normal for the program), but subsequent checking is based on weight-for-height measurements established by UNICEF and the Protein-Calorie Advisory Group of WHO.

The advantages of a nutrition-based system are:

- It permits better targeting, i.e., it gets the food to those families most in need.
- The program is easy to adjust.
- There is a lower total food requirement; therefore the program is less expensive.
- There is less adverse impact on the market. If people are thin, they obviously are not participating in the full market economy.
- The program permits easy monitoring of other factors and problems in the community. Since children are being seen once a month, it is easy to add other health outreach programs and surveillance to the food distribution activity.
- It is easy to discharge people when the need is passed.
- It is less difficult to phase-out the program and there is less impact because of gradual reduction as people regain full health.

The disadvantages are:

- More staff is required. Usually the program is carried out by a voluntary agency or the health authorities of the government.
- It requires sound recordkeeping on an individual basis.
- It requires a higher degree of sophistication to operate the program, although, once the program is set up, it is relatively easy to monitor and manage.
- In some cases program administrators may see a "starve a child" syndrome develop, where one child is intentionally deprived of food in order to keep food flowing to the family. In actual practice, however, this has been rare and can usually be overcome by distributing food specially designed for childrens tastes and by home-visiting by program staff.

The reasons why a general village distribution program was selected by the Branch Office were explained in detail by the Representative. The primary consideration is that the government feels that it can administer such a program and has a reservoir of experience gained in the Lewero operations of last year. Nonetheless, the consultants feel a bit uneasy about the distribution program. First, village-level distribution committees are at the moment an unproven element of the program. Second, it is unclear how many of the staff active in the Lewero program would actually be employed in West Nile. Third, even spot-checking food distributions may prove to be problematic. Large amounts of food could simply disappear between the village distribution point and the individual families.

In addition, the actual food situation in West Nile is unclear. While it is generally reported that there will be food shortages, the consultants were impressed with the amount of crops that appear to have been planted throughout the province. In particular, large numbers of cassava fields were observed. Growing cassava is a traditional method of fighting food shortages in the region (see Appendix E). Of course, the total food deficit will be dependent on the number of people coming back at any one time. However, given the current situation, we feel that some food surplus might be available if the number of people coming back is substantially less than the initial planning figure of 100,000. Therefore, a village distribution program might serve to have an adverse impact on food production in the area.

For the above reasons, the following recommendations are made:

1. Retain a specialist from FAO or other sources to conduct a crop estimate and a food-needs survey.
2. Begin collecting market data on food prices. The form shown in Appendix B should be reproduced and given to the three principal field offices in the project area. Information should be graphed on a weekly basis and, anytime that food prices are seen to drop by 25% or more, the amount of food being distributed should be reassessed.
3. It is recommended that a nutrition-based distribution system be considered. Technical assistance in setting up the system could be provided by a number of organizations now in Uganda, including several who are currently implementing partners of UNHCR (MSF and LWF).

An additional set of problems regarding food distribution should be anticipated. Because the system is returnee-based (i.e., only returnees get food), there may be problems if there

is a major food shortage and other people living in the area (non-returnees) seek food aid. At most, returnees receiving food at any one time under the current program would likely make up less than 20% of the total number of people in West Nile Province. Many returnees may bring food or cash and will not require food aid while many people now living in West Nile may. Therefore, the program could easily be criticized for providing food to those not in need, while others in the area are malnourished. For this reason, a more equitable approach would be to establish, for the period of repatriation, a need-based program where anyone in the project area in need of food assistance would qualify on the basis of need. Under this scenario, UNHCR would be helping the recovery of the entire community and furthering the development of the area. Since the West Nile area is relatively small, such a strategy could likely be carried out with the food aid that is currently available and in the pipeline.

Additional Recommendations Regarding Food Distribution

1. Review and Revise the Ration Registration System

It is recommended that a map-based system be adopted whereby spot-checking will be facilitated. (To this end the consultants purchased and delivered to HCR a complete set of 1:50,000 scale maps of the project area. Several maps were missing but could be printed on short notice by the geographic office in Entebbe if proper inks are provided. A list of the necessary materials has been provided to the branch office as well as to the Africa division of UNHCR.)

2. Streamline and increase buffer stocks.

As soon as logistics permit, buffer stocks should be developed in each of the project warehouses. For the first few food shipments, it is recommended that the program plan on building contingency stocks of one grain, oil and a protein source. Until these stocks are in place in adequate quantities, additional foods to diversify the food basket should be delayed.

Buffer stocks should include sufficient food to meet the needs of the incoming returnees as well as those that are already enrolled in the program, i.e., the buffer size will increase each month. (The figure of 20,000 returnees per month is the current planning estimate. A more realistic formula would be $20,000 + X$ where x = the number of people receiving assistance the previous month plus 10% contingency.) Field officers should be given permission to draw down on stocks if the numbers of people returning are less than forecast.

Conduct weekly spot checks. In addition to the weekly movement summaries mentioned on page 11, it is recommended that storekeepers conduct physical inventory checks weekly which should be conveyed with the Dispatch and Receipt Logs as a weekly report.

To facilitate spot checking, storekeepers should be trained to stack commodities in blocks of predetermined numbers with surrounding space for ventilation and passage. Physical checks can thus be rapidly and accurately made by counting the units in the length, width and height of each block.

4. Prepare a contingency fund for local purchasing.

It is believed that some amount of food will be available for local purchase from the farmers currently growing food supplies in the area. In case logistics are temporarily disrupted, the Sub-Office in Arua should have authority to make local purchases if necessary.

Stage III Transport

At the present time, UNHCR proposes to acquire a small fleet of trucks to move people and food in the project area. However, recent experience has shown that the government is prone to requisitioning the trucks for military purposes. A review of the plans leads to the following recommendations:

1. Explore an alternative project area transport system.

Option 1: Use tractors instead of trucks in the distribution system. The principal requirement for transportation in the project area is for the movement of returnees from the border to reception centers, the movement of returnees from reception centers to villages, and the movement of food from warehouses to reception centers and villages. In most cases, the distances are fairly short and the amount of food or people that would be moved at any one time is relatively small. Therefore, the requirement for transportation could easily be met by the use of tractors and trailers instead of trucks. The advantages of using tractors are:

- They are cheaper to buy.
- It is unlikely that they would be confiscated for military purposes.
- They are safer.
- They are cheaper to operate.
- Because they move at slower speeds, they are less prone to breaking down.
- Maintenance is easier and cheaper.

- Provision of tractors to the area would support the agricultural recovery much more comprehensively than would trucks. (The tractors could be turned over to the Agricultural Ministry or to tractor cooperatives in each village or sub-district).

Option II: Use contractors to provide trucks for local distribution. It is the opinion of the consultants that had the trucks assigned to the project area been owned by private contractors, the likelihood of their being requisitioned by the Army would be greatly reduced. This is especially the case if the trucks had been provided by a Kenyan trucking firm. Therefore, if the project wants to reduce the likelihood of vehicle confiscation two approaches could be chosen. The first would be to hire lorries from existing firms in Kenya or Uganda. The second would be:

The Option III: Organize a trucking co-operative, purchase the trucks and turn them over to the drivers under a turnkey work-purchase program. Under this option, the trucks would be "captive" to the program under an agreement between the drivers and UNHCR for a period to be determined mutually. With such a program, HCR would be supporting the development of trucking infrastructure in the area and at the same time reducing the likelihood that the trucks would be requisitioned.

Roads in the Project Area

The consultants evaluated all principal roads in the project area. The following observations are hereby submitted.

Road Surface Conditions -- All roads in the project area were reported to be in need of major repairs. However, in the consultant's opinion, all road work could be handled easily by graders and hand labor. The two worst stretches are an area in the swampy land on the westward approaches to Moyo (a tetze fly area) and a short stretch of the road on the descent from Moyo to the ferry landing at Laropi. Given the fact that the rainy season will end before any heavy equipment could be provided, it is likely that hand maintenance and the existing graders can easily handle the job. Furthermore, if the tractors and trailers suggested earlier are procured, they could be provided on an as-needed basis to move laterite for road surface improvements.

A brief manual on road maintenance techniques using manual labor is attached as Appendix C.

Bridges -- All bridges in the area appear to be adequate for the needs of the project. On the road between Arua and the border crossing point at north of Koboko, all bridges are

concrete with iron supports. Each bridge is rated for an axle load of 15 tons. Since the bridges are small, all lorries up to 30 tons can utilize the bridges safely, since no more than 1 axle would ever be on the bridge at one time. Since most vehicles operating in the project area would utilize a tractor-trailer arrangement, there should be no problem in moving food across the bridges on this route.

On the road between Arua and Moyo there are several small bridges which have wooden planks on steel beams. (The beams are imbedded in a concrete embankment). While these bridges will not sustain heavy traffic for a long period of time they are serviceable and, if maintained regularly, should be able to bear up during the emergency period.

Fuel

The rehabilitation of bulk underground fuel storage facilities has not yet been initiated. It was reported that several facilities might be available, but it was unclear to the consultants whether the facilities had yet been checked. While fuel could be stored in barrels, this form of stockpile is far more susceptible to requisition by non-relief authorities, and controls could be difficult. If UNHCR is going to operate a transportation system in West Nile Province in parallel with LWF and other implementing agencies, a comprehensive fuel agreement needs to be worked out prior to rehabilitation of the underground bulk storage facilities. While the general principles for the fuel arrangements were agreed upon, the agreement should be concluded and formalized as soon as possible.

It is important that the integrity of the tanks be checked as soon as possible. It is recommended that a technician be hired by the Branch Office from the local representatives of fuel suppliers (Agip, Caltex, or Mobil). It was reported that LWF would undertake to carry out this assessment; however, in the opinion of the consultants, it should be carried out by one of the suppliers.

Management and Coordination

In order for the logistics operations to be successful, a number of measures need to be undertaken to improve overall management and coordination. These include:

1. Improvement of communications.

At the present time, UNHCR/Uganda utilizes single-side band radios for communications. A number of previous missions have already reported on the problems of communications and they will not be repeated here, except to say that it is imperative that the radio net be improved and that radio transmission procedures be adopted and observed.

2. Improvement of air services.

Rapid transportation to the area from Kampala is currently available through charter aircraft from two sources. First, a project plane is available from a private contractor based in Zaire. The aircraft, a Beech Baron, is capable of carrying six passengers and can land in either Arua or Moyo.

The problems associated with operating this aircraft are generally related to the difficulty of obtaining permits for flights to and from the area. The biggest problem is securing permission for the airplane to land in the West Nile Province.

Previous missions have proposed that a regular schedule between the West Nile and Kampala be established so that the problem of permissions can be reduced. While this option appears to be viable, the consultants feel that another option should be explored. This would entail leasing or purchasing a Cessna 206 and stationing the aircraft on a permanent basis in Arua. The 206 is a single-engine aircraft capable of carrying six passengers and can operate more safely out of the existing airfields in the project area. In addition, if the 206 were fitted with a short take-off and landing (STOL) kit, additional airstrips could be cleared at Yumbe and Pakeli (on the northeast side of the Nile). With these airstrips intact, the head of the Sub-Office could regularly visit the Field Officers and the principle project sites more rapidly and could extend "hands-on" management and coordination should an emergency develop.

By basing the plane in Arua, the problem of permits can be largely avoided. Permission to operate the aircraft in West Nile can be quickly obtained from the authorities in West Nile Province since radio communications are not difficult within the area. Flights to Kampala can be handled through the "air filing" procedure permitted under international aviation rules. In other words, an airplane departing from a remote site can contact an airport with a control tower and file a flight plan in the air; thus necessary permissions to land at Entebbe can be arranged by the aircraft enroute. If Branch Office personnel or visitors from Kampala wish to visit the project area, arrangements can be made for the plane to come to Entebbe to pick them up far easier than for a flight to go from Entebbe to the project area.

It was reported by the Branch Office that the Kololo airstrip at Kampala could possibly be used by project personnel. This airstrip will handle small planes and reduce the time necessary to get to the airport (the journey from Kampala to Entebbe takes approximately 45 minutes to an hour).

The consultants visited Wilson Airport in Nairobi and obtained a list of 206s for sale and lease which was transmitted to the BO via Geneva. It should be pointed out that the operator of the plane (Baron) currently used by the project is reported to also have a 206.

III
RECOMMENDATIONS RELATING TO CONTINGENCY PLANNING
FOR REFUGEES FROM SOUTHERN SUDAN

General Comments

At the time of the assessment mission, approximately 1,000 refugees from southern Sudan had entered Uganda and were being provided temporary shelter at a small refugee camp at Fouda. While the rate of influx is minimal, the fact that new arrivals continue to enter the camp is an indicator of some concern. In preparation for a larger influx, UNHCR has been able to obtain a new site for a larger refugee settlement on the eastern bank of the Nile. The Field Officer assigned to Adjumani has responsibility for establishing the new camp. This Field Officer has extensive experience in camp planning and management and should have no problem carrying out this task if adequate local personnel are made available.

Recommendations

1. Establish planning thresholds.

It is recommended that, at any time the population of the camp doubles in a one-month period, an emergency situation be considered to be in effect regarding refugees from southern Sudan.

2. Establish a health surveillance system for the camp.

The consultants carried out a simple random survey of households using the survey form attached as Appendix D. From this survey it was learned that four children under the ages of five had died in the last 30 days. This translates to a gross death rate of 1.5 persons per 10,000 per day. While the death rates is under the level considered to be an emergency and is within the norm for the rural population in that area, it is approaching a level where closer attention to sanitation and health measures may be required.

3. Establish a 10-day ration distribution routine for the refugee camp.

Once the ration distribution level has been established, it should be carried out a 10-day distribution cycle. While it should be possible to provide more food less often, establishment of a 10-day routine now would help set the pace and familiarize the staff with the 10-day distribution routine should a larger emergency require it.

4. Improve the screening/reception of new arrivals.

At present refugees claim that some have entered the camp directly without being processed at the border. If this

practice continues, a number of Ugandans living in the area may try to enter the camp claiming to be refugees. Therefore, all screening and reception should be carried out at the border.

5. Initiate a program of instruction for NRA border guards on refugee reception and treatment.

Most of the military forces operating in the northern area are very young and unprofessional. In order to reduce future problems, a series of orientations on the treatment of refugees entering the country should be given those soldiers stationed on the border who might encounter refugees as they first cross into Uganda.

IV.
RECOMMENDATIONS RELATING TO ASSISTANCE FOR
DISPLACED PERSONS IN THE PROJECT AREA

General Situation

A number of returnees have been displaced from their original villages due to tribal rivalries and land grabs by persons remaining in the area when the refugees fled. An encampment of approximately 500 people has been established near Adjumani to provide temporary accommodation. At present, UNHCR is providing limited assistance to the settlement pending resolution of the case. Since these people are returnees, not refugees, they should have access to normal markets, although at the present time they do not have access to land upon which to grow their own food. Therefore, a larger ration on a 10-day distribution system might be warranted.

Recommendations

A comprehensive policy and plan for dealing with displaced persons needs to be developed and the rations set up according to agreements worked out with the Government of Uganda. On an interim basis, it is recommended that a 10-day ration distribution system be established for those living in the temporary settlement. This would make the distribution system compatible with the distribution system at Fouda, thereby simplifying logistics and enabling uniform logistics planning. In addition, the same registration and ration card system could be used.

FOOD STORAGE

handbook
on good storage practice



WORLD FOOD PROGRAMME

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1. INTRODUCTION

Considerable losses of foodstuffs occur during their delivery, storage and distribution. It is known that many of the food losses presently occurring could be reduced through improved handling and storage practices.

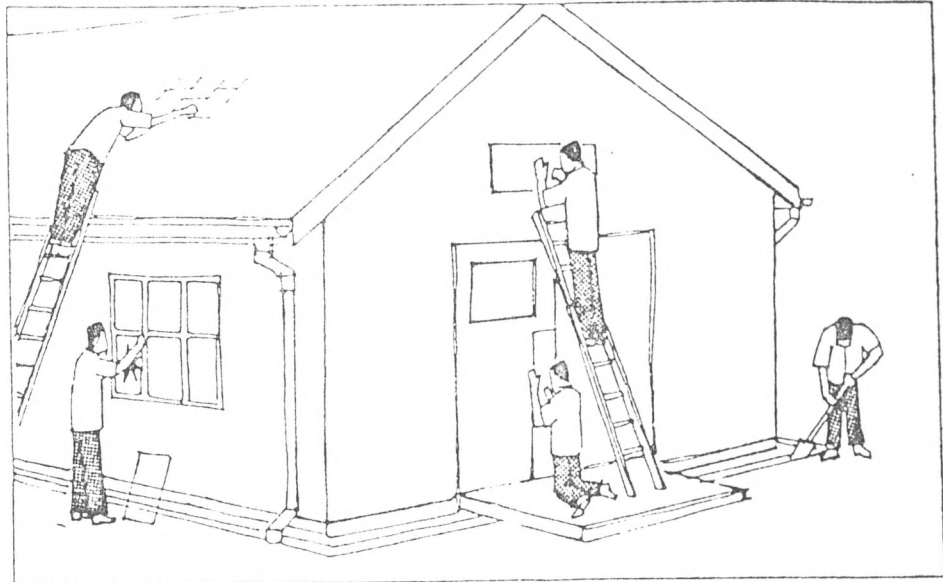
The purpose of this handbook is to provide simple and clear instructions in the basic principles of good storage practice, primarily to storekeepers and their supervisors, at the field level who are in charge of warehouses, where food commodities supplied by the World Food Programme (WFP) are being kept. This handbook attempts to cover in a simple manner some of the basic principles of receipt of goods, handling, stacking, store cleaning, inspection of stocks, waste disposal and accounting and record keeping.

Many storekeepers regard storage solely as a book-keeping exercise in that they think they merely have to account for what has been received and what has been issued. A storekeeper should realise that from the time of arrival to the time of issue, what happens to the food stocks in his care is his responsibility. His job is not only clerical, but also one of supervisor, inspector and manager.

It is hoped that this handbook will help a storekeeper to be all of these.

2. THE STORE

Keep the store in good repair



Roof

Look for leaks. repair them or ask for repairs (protect food beneath leaks).

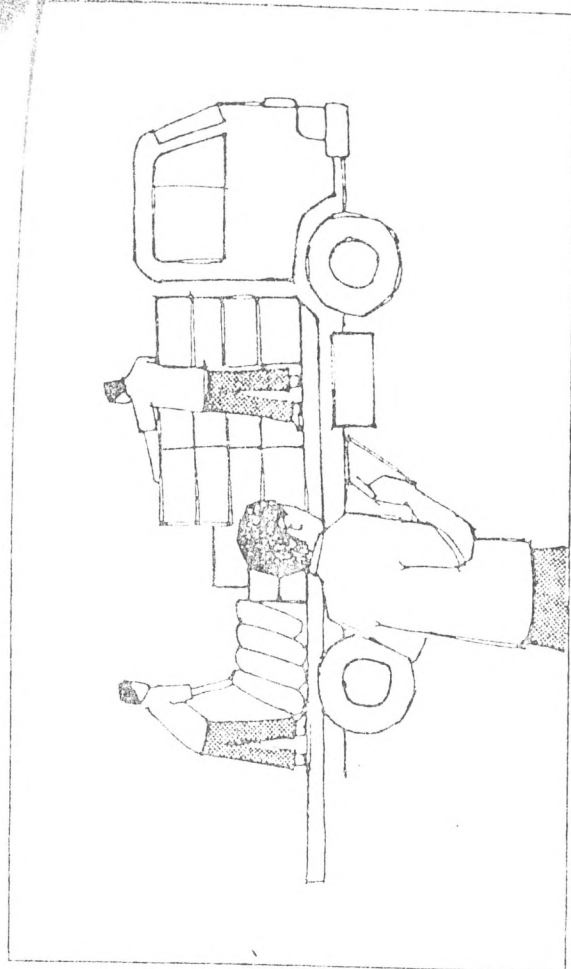
Doors, windows, ventilators

Keep in good repair, make them rat-, mouse- and bird-proof, if necessary.

Gutters and drains

Keep channels clean, repair where necessary.

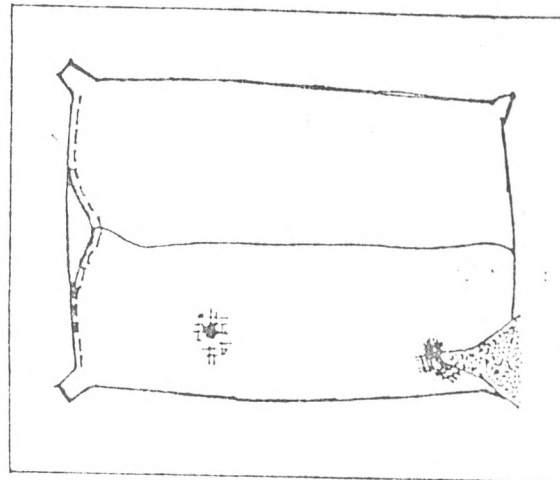
3. UNLOADING



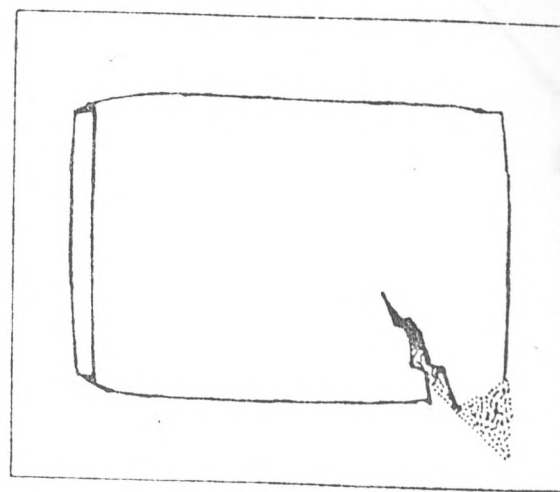
Inspect and count the food stocks carefully as they are unloaded.

Look for

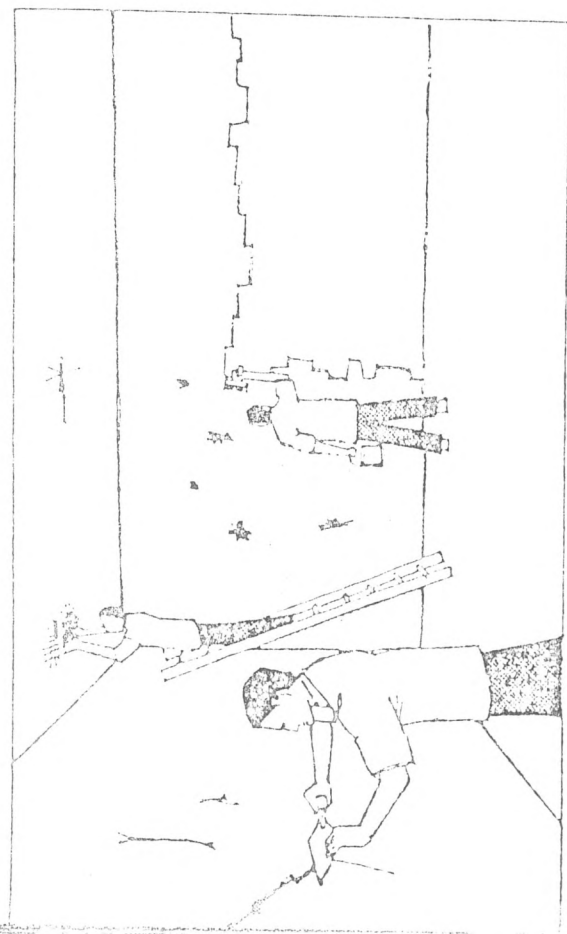
1. Damaged containers.



Damage to sacks.



Sacks - many times



Fire prevention

If fire extinguishers are provided they should be kept outside the store, or just inside the doors, where they can be easily reached when needed. Smoking should be forbidden inside the store.

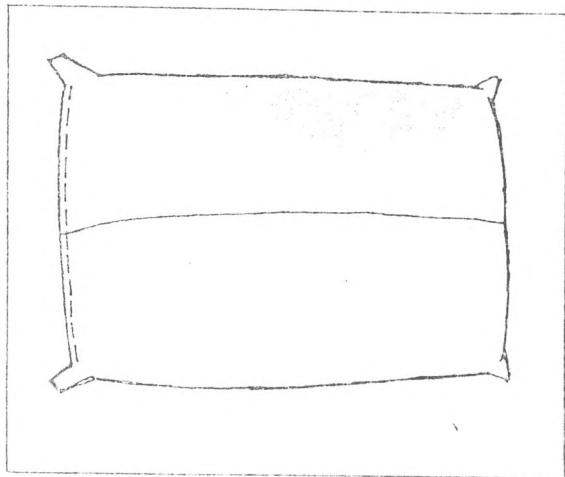
Burn rubbish a safe distance from the store.

the concrete smooth and crack free. Repair holes in wooden floors, large gaps between floor-boards, keep any spaces underneath the floor, and treated with a suitable insecticide.

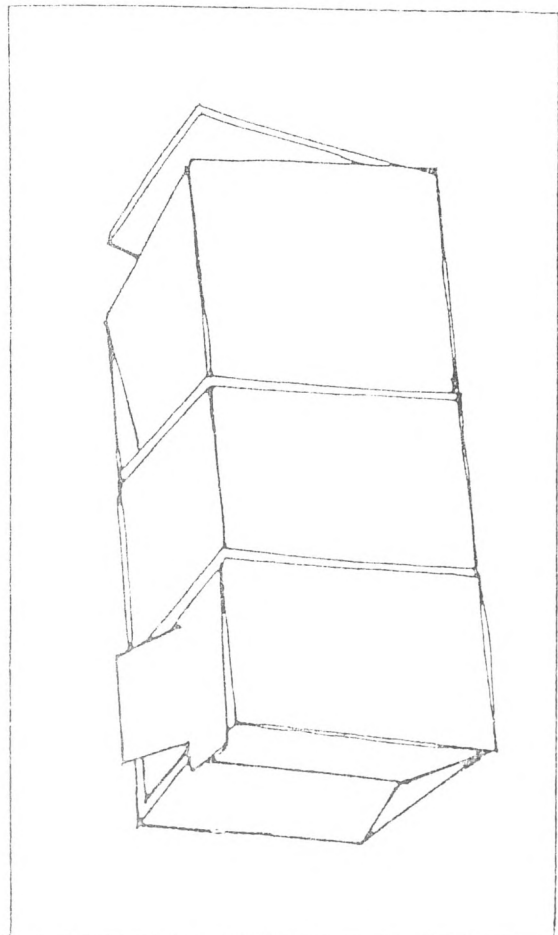
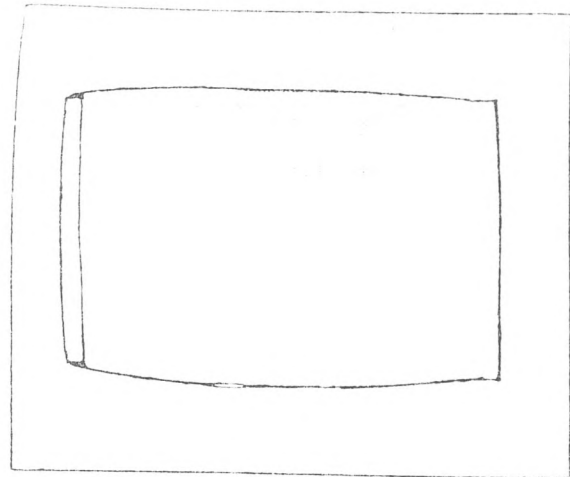
store is not well maintained, it will not protect food against damage water, insects and rodents, nor loss from thieves.

store must be thoroughly cleared before putting food into it.

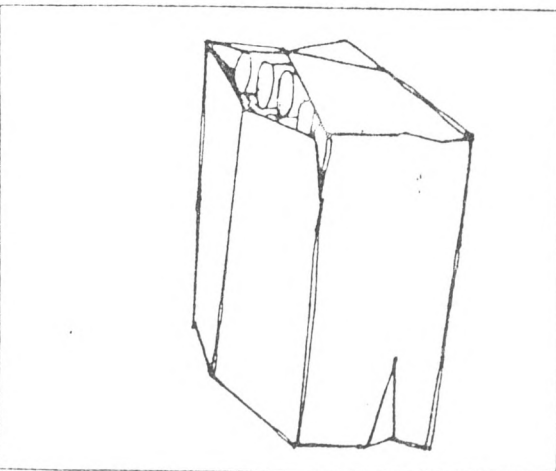
2. Water damage.



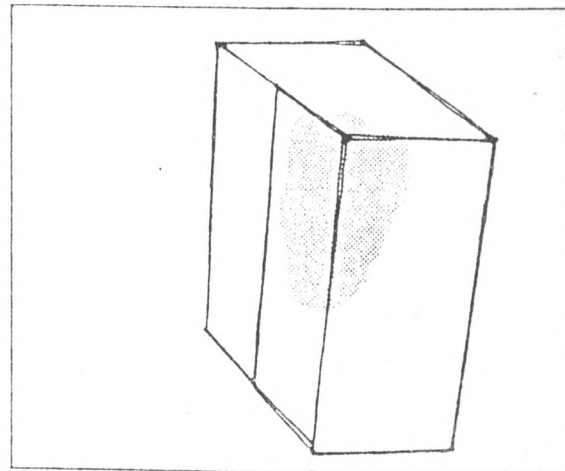
Wet sacks.



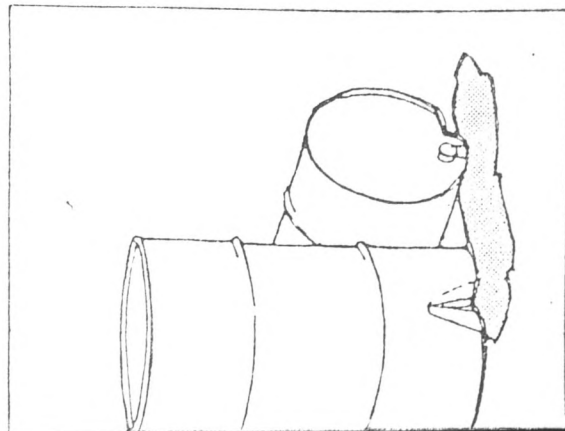
Damaged wooden boxes.



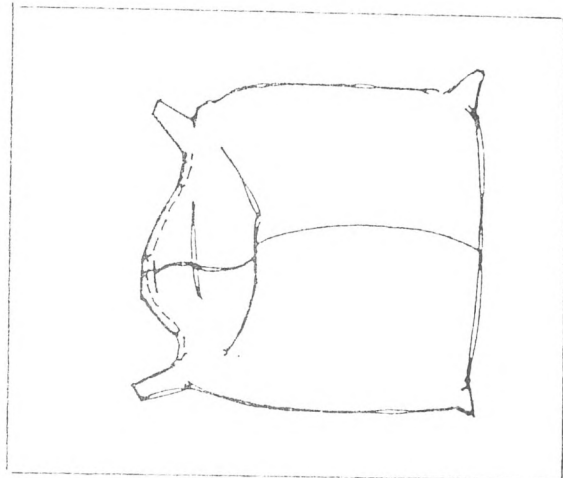
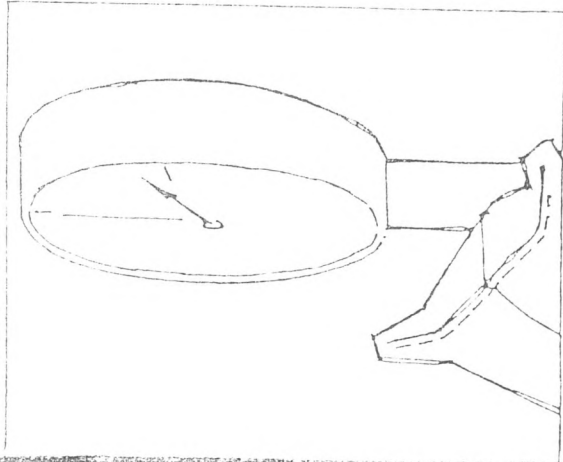
Damaged cartons.



Damaged cartons.

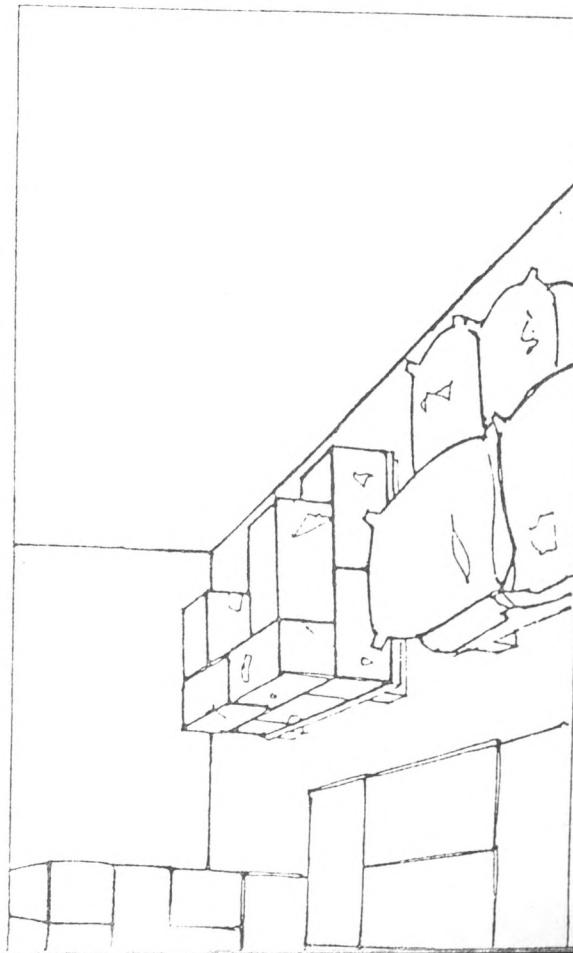


Damaged cans.

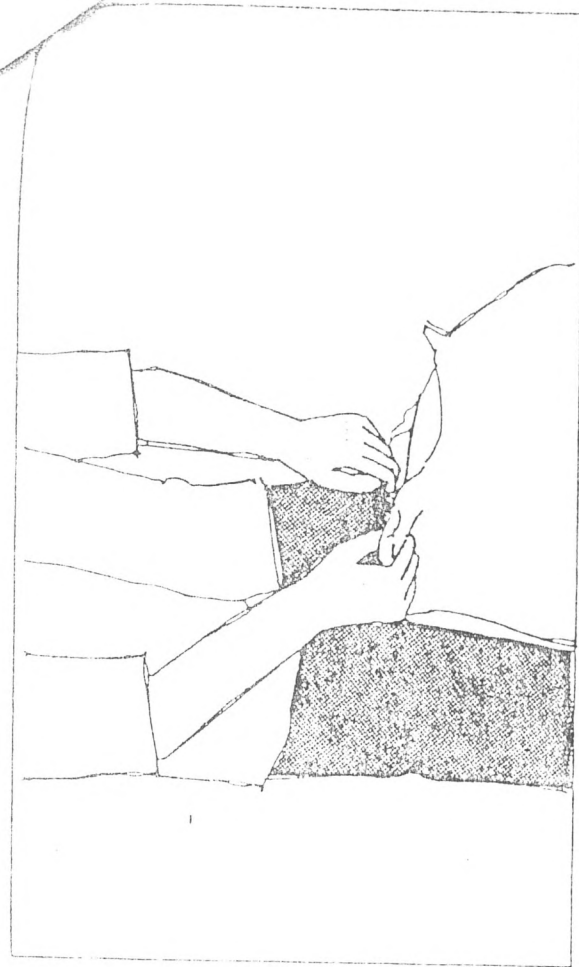


Underweight bags.

Separate all damaged goods

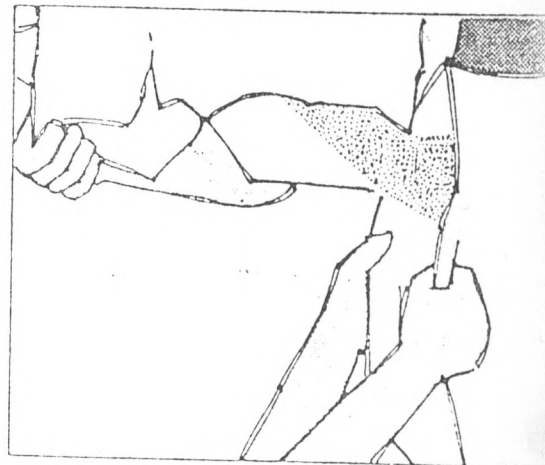


ack damaged bags and packages separately from undamaged goods.
 Do not mix different types of damaged goods.
 Record the number of damaged bags and packages for each consignment.
 Deal with wet packages as you have been instructed; if there are no
 instructions ask for them.

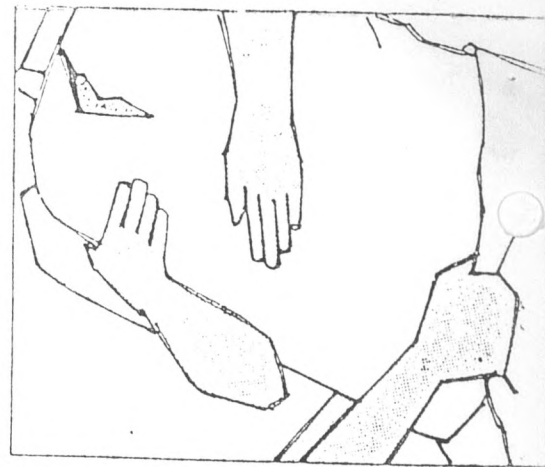


Repair damaged bags as soon as possible.

Repack split bags



or

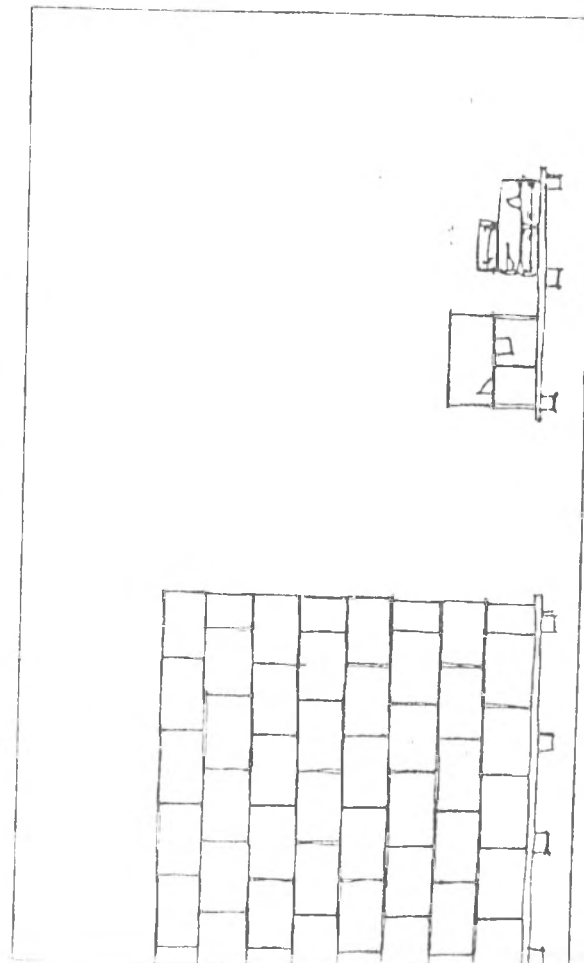


Repack damaged cartons

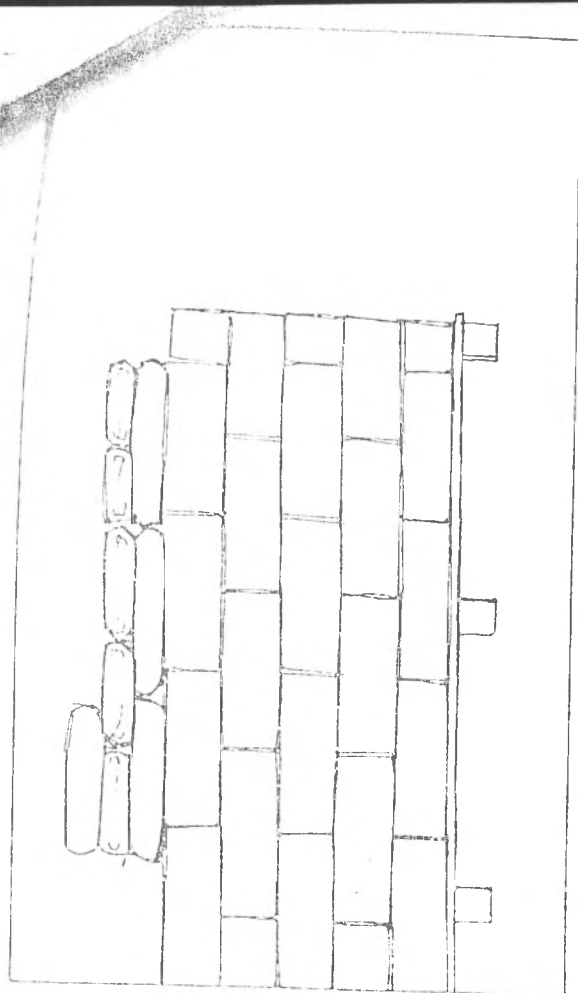


Issue damaged packs first, if the contents are good.

Restack repaired packages separately for early issue.



If plenty of space, stack on the floor.

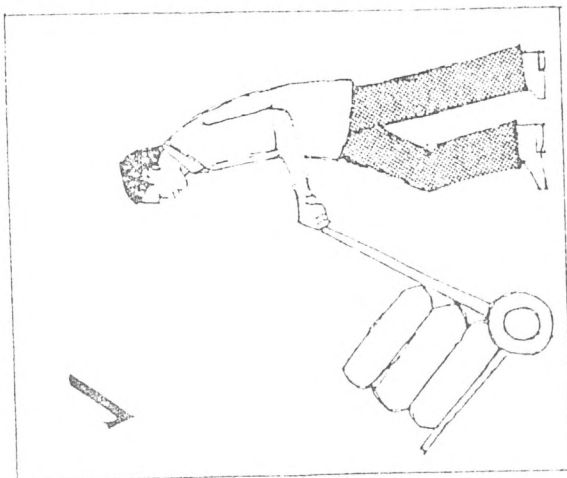


If space is limited, stack above sound packages.

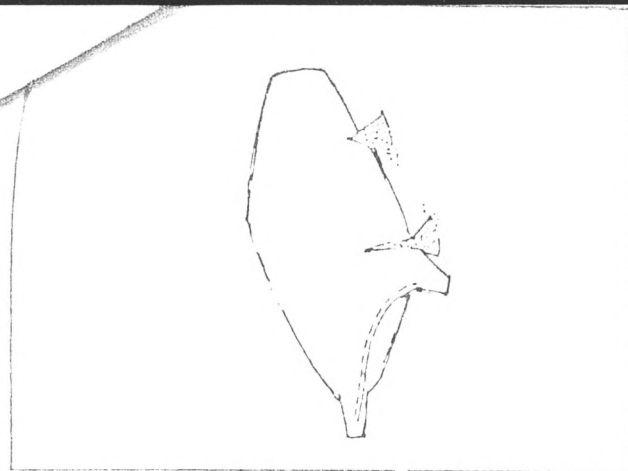
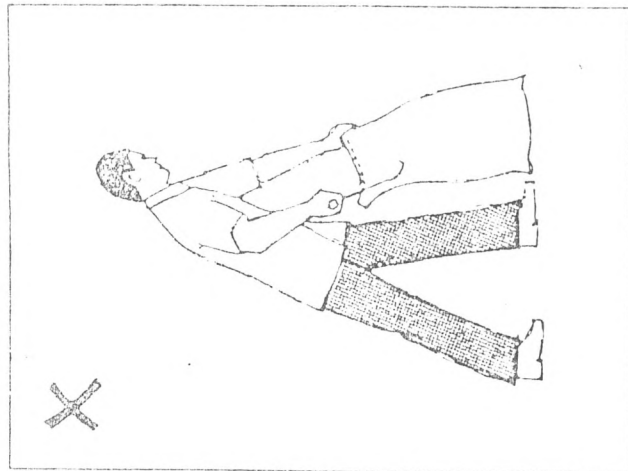
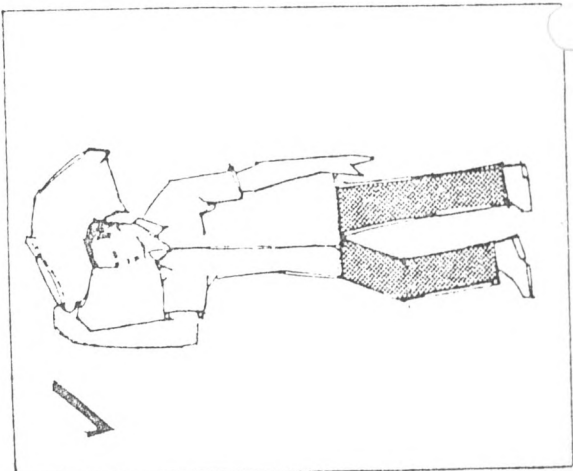
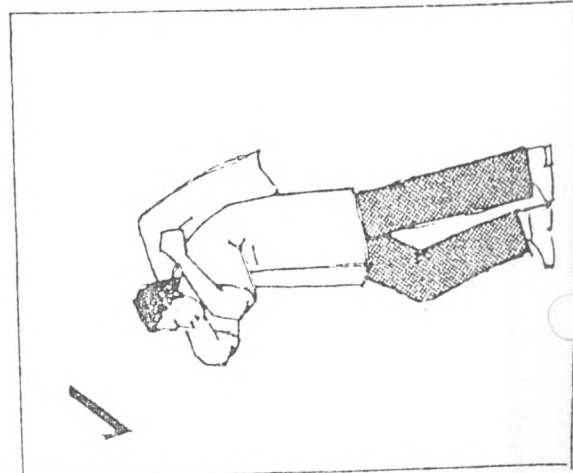
Food unfit for consumption
See Section 10, page 41.

4. HANDLING

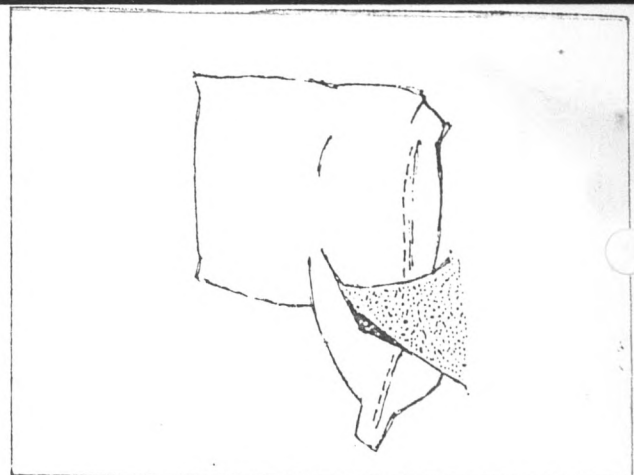
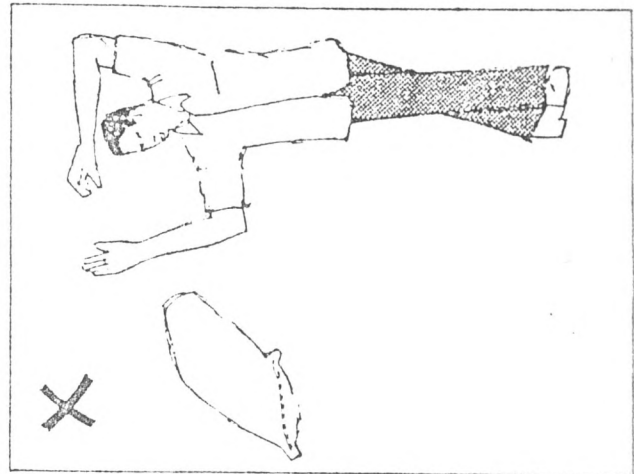
Handle all packages with care.



Use sack trolleys when available.



Do not use hooks → grain spills from the holes.



5. STACK LAYOUT

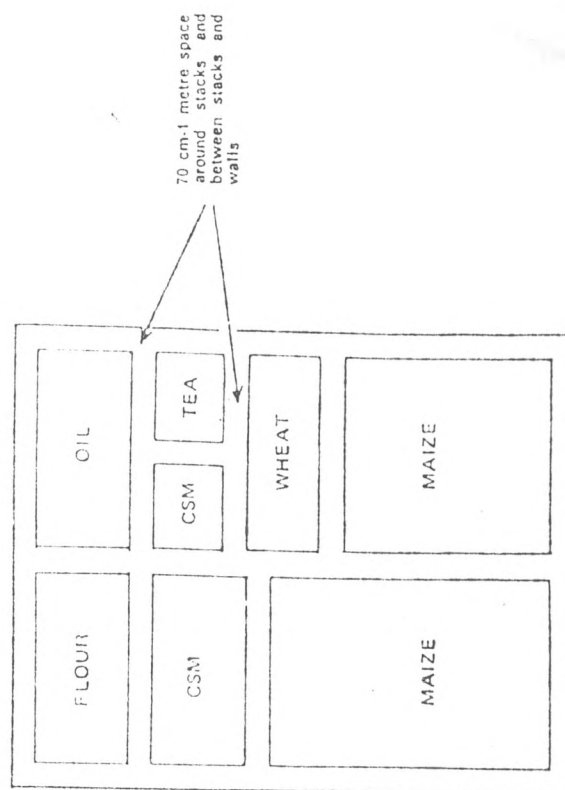
Plan the layout of goods before receipt.

1. Large store — layout plan.



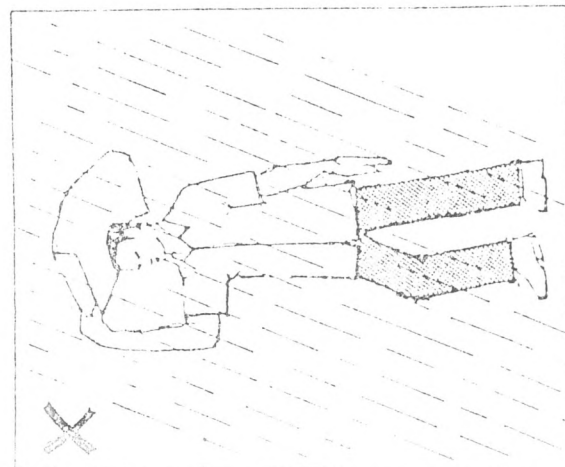
Do not allow lorries to enter the store unless this has been specifically authorized — they may damage the floor.

2. Small store — layout plan.

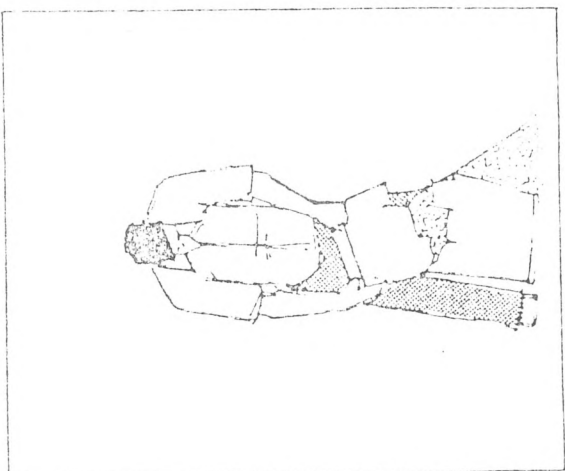


In all stores spaces between stacks must allow:
a man to work around them

Cleaning and inspection of all stores at least weekly



Do not load or unload in the rain.

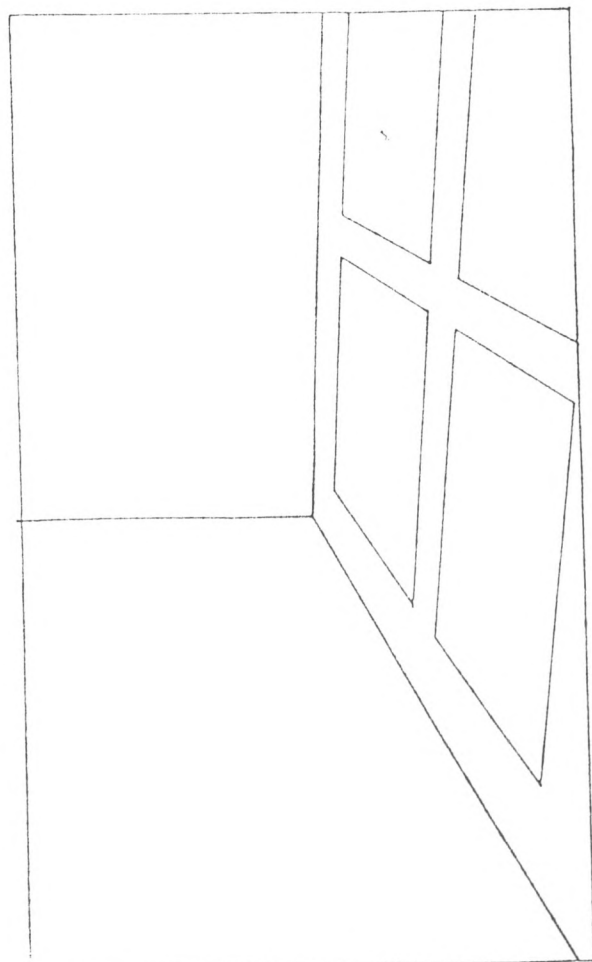


Wetting weakens paper sacks and cartons.
Grain in lute bags, if wetted, quickly goes mouldy and may even germinate.

The spaces should NEVER be less than YOU need to walk around ALL stacks.

Access space must allow easy loading and unloading. If loading machines are used, there must be space for them to operate without damaging the stacks of commodities.

Lines painted on the floor can help as a guide for access space while loading.

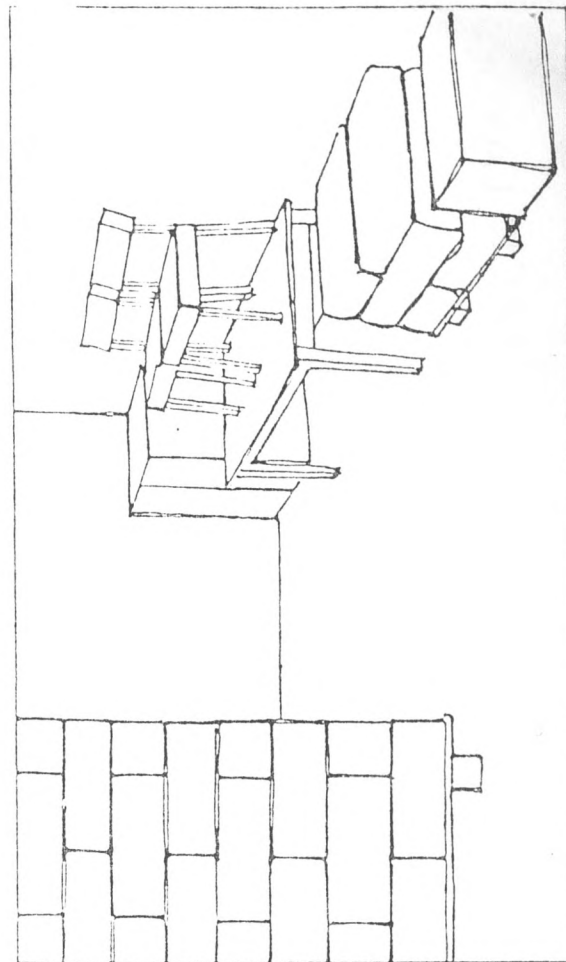


Lines painted on the floor to show stack boundaries.

D S M 25 Kg Nov 77	D S M 50 lbs Nov 77	WHEAT FLOUR Feb 78
MAIZE Feb 78	MAIZE Nov 77	OIL Nov 77
		TEA Jan 78

These stacks should be labelled according to their arrival date in the store, with the date written on the stock card.

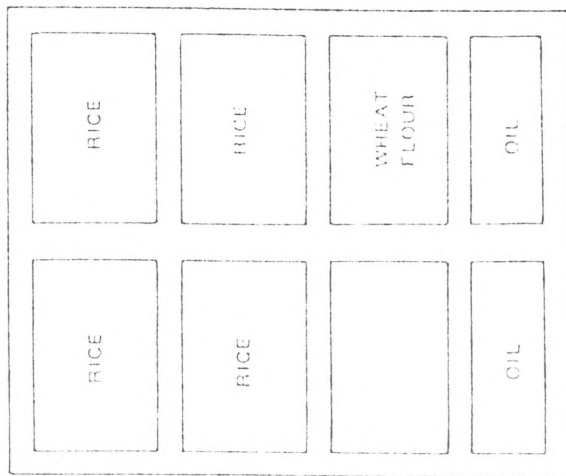
Keep food commodities separate from general stores (tools, machinery, furniture, etc.)



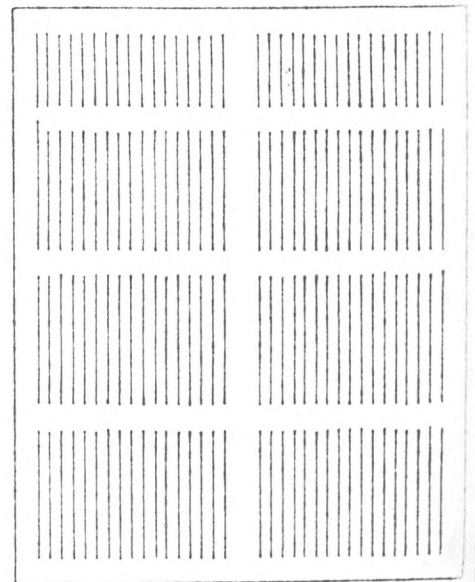
Different commodities, different packages and those arriving at different

6. STACKING

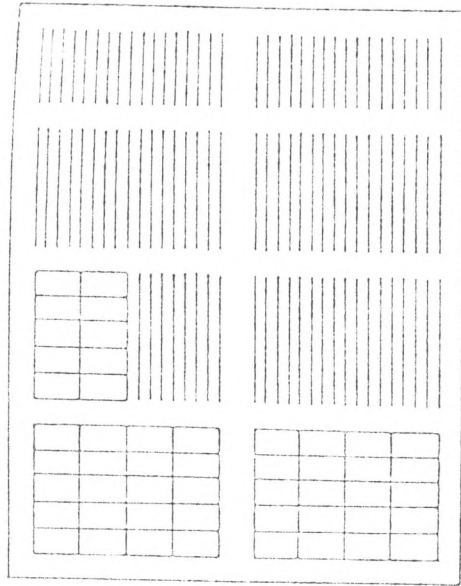
1. Clean the floor before building the stack.
2. Make stack layout plan.



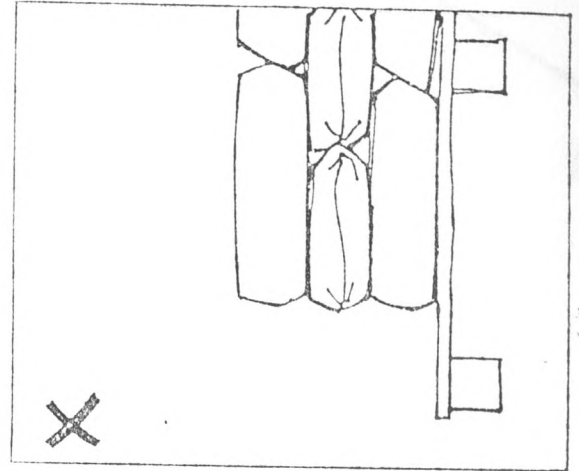
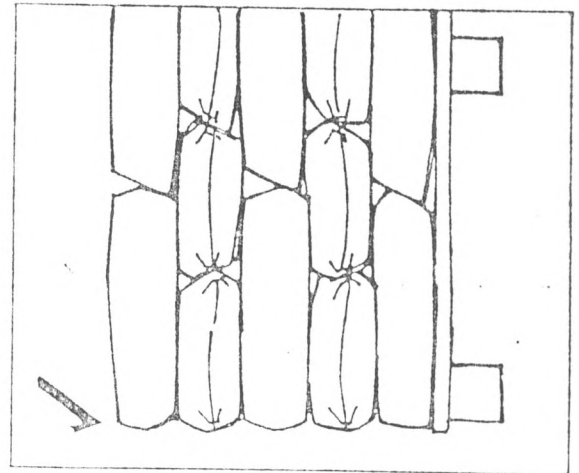
3. Place dunnage (platforms) in position.



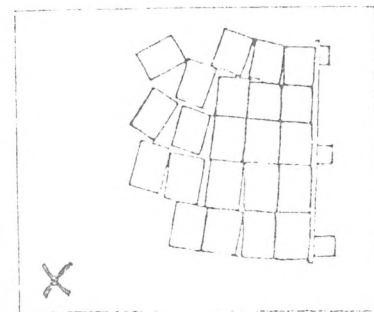
4. Build stacks.



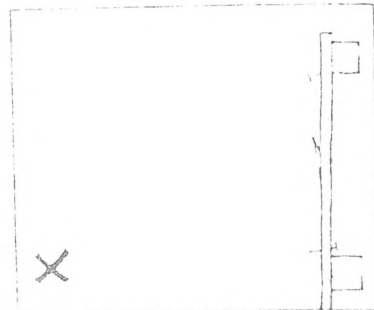
5. Dunnage should not project beyond the bottom of the stack.



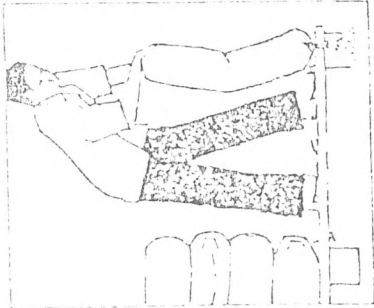
Dunnage should be clean, level and free of projecting nails and splinters.



If the dunnage is not level the stack may fall down.



Remove nails and splinters or



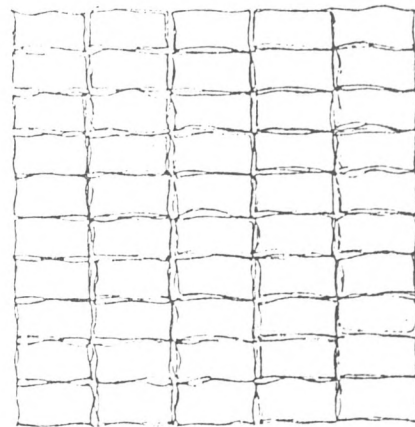
the bottom bags will be torn and food lost through spillage.

If there is not enough dunnage use what you have to protect food in bags, before food packed in cans or bottles.

If the floor is damp and you have no dunnage, bags may be stacked on a plastic sheet.

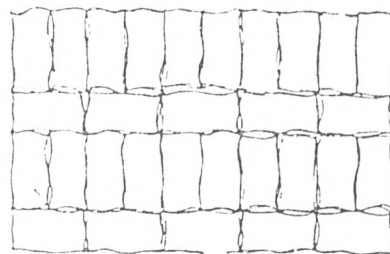
6. Stacks should be built so that packages can be easily counted. Example of floor layouts for stacks —

10 bags wide



5 bags long

2 rows of units



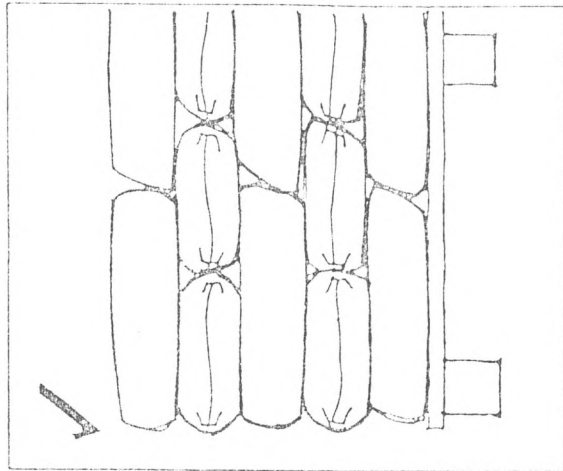
3 bags in each unit
5 units in each row

or

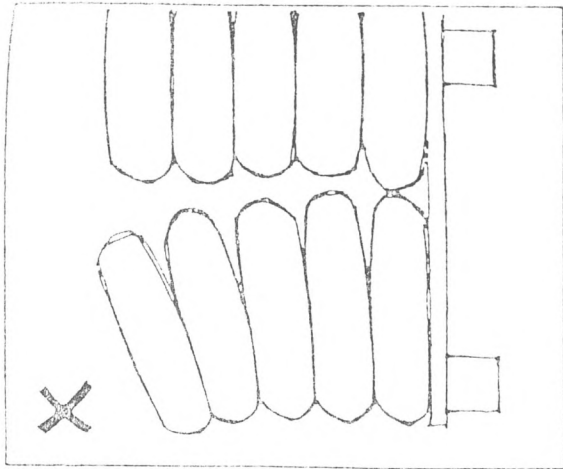
There are 30 bags in each layer of this stack. If this stack has 10 layers there will be 300 bags in the stack.

5 X 10 bags = 50 bags in each layer of this stack. If this stack has 14 layers there will be 700 bags in the stack.

7. Stacks should be built firmly and bonded to prevent them falling over. Bonding: the easiest way is to cross-stack each layer of bags or boxes.

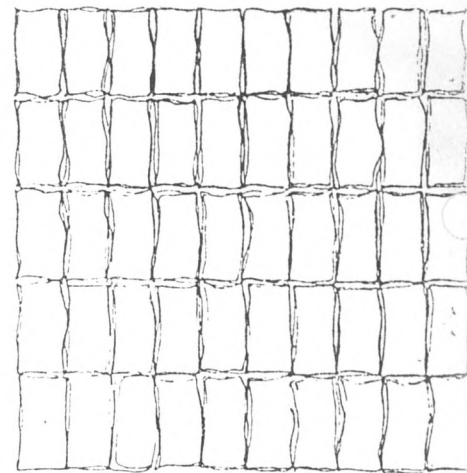
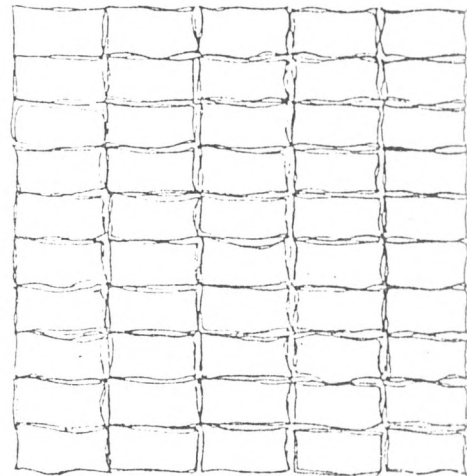


Bonded stacking is safe.

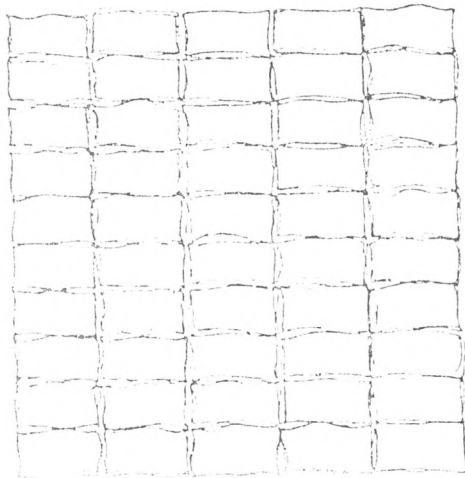


Unbonded stacking is dangerous.

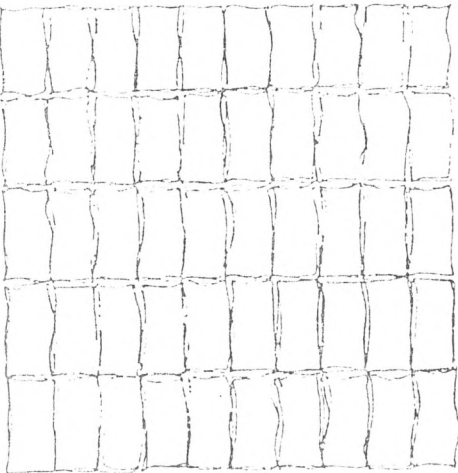
Bonded stacking is carried out by placing each layer of bags in the opposite direction from the layer below.



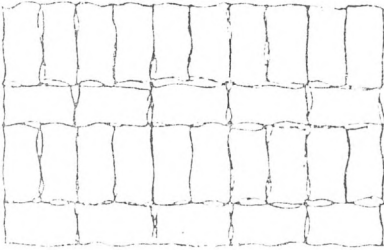
The size of stack you choose will be according to the quantity of food



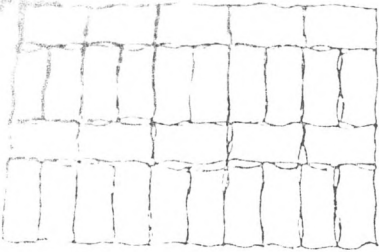
Third layer.



Fourth layer.



Third layer.



Fourth layer.

and so on, to the top of the stack.

Remember

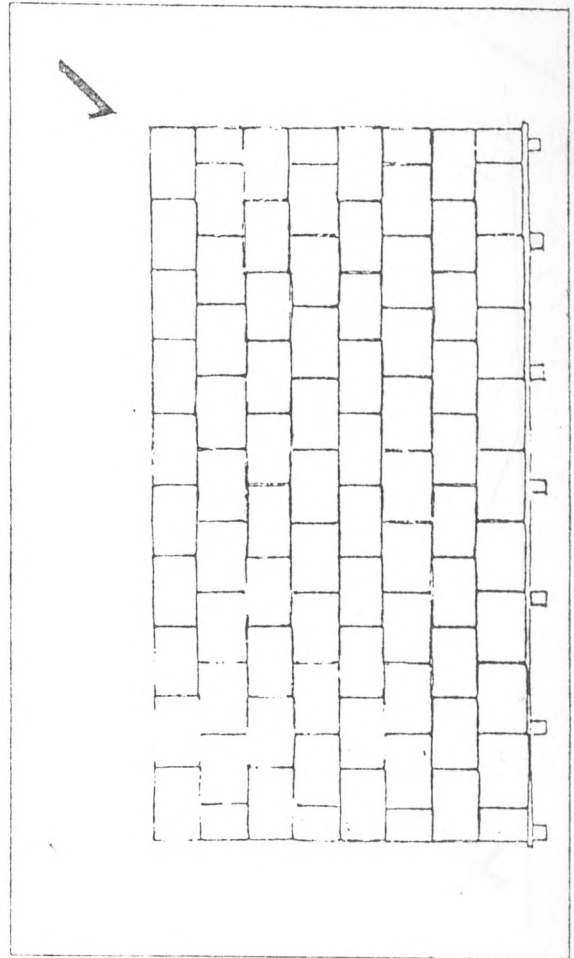
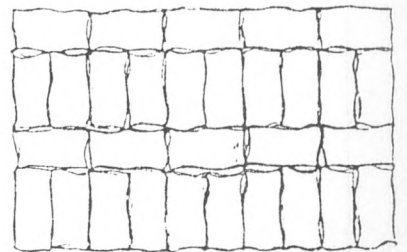
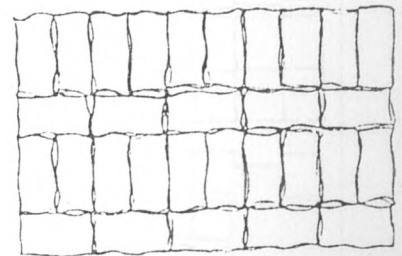
stack damaged packages separately

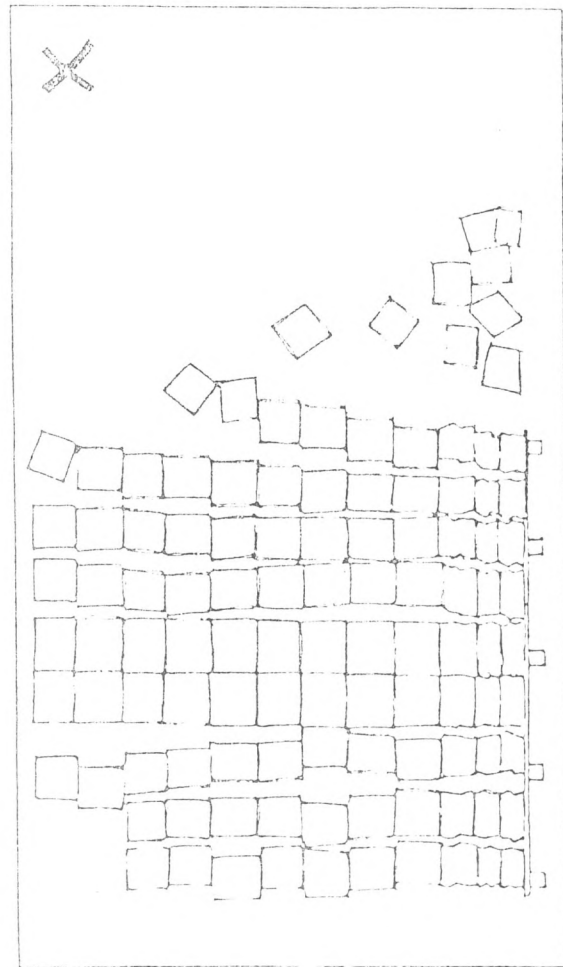
stack oil in cans and bottles the right side up or they may leak

There are other methods for bonding stacks. If you are experienced in another method you may prefer it, but it is your responsibility.

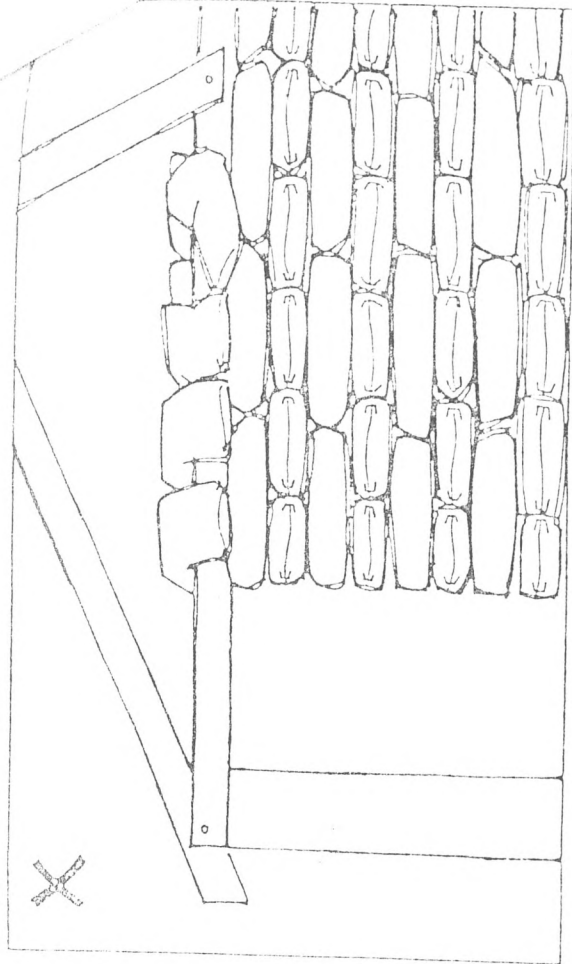
8. Stacks should not be built so high that packages at the bottom are crushed or split.

An alternative method of stacking bags is given below.



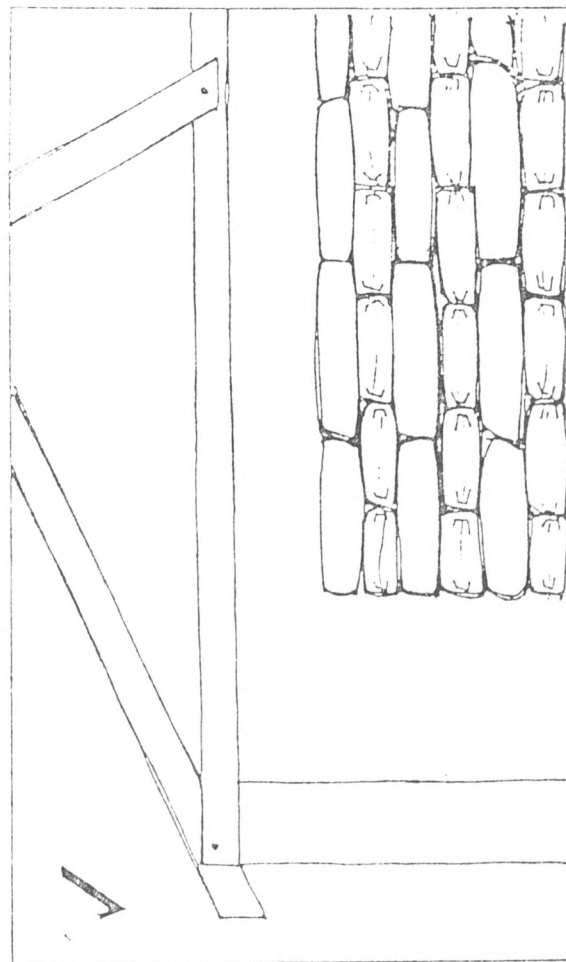


Unsafe stacking: bottom cartons crushed and split.

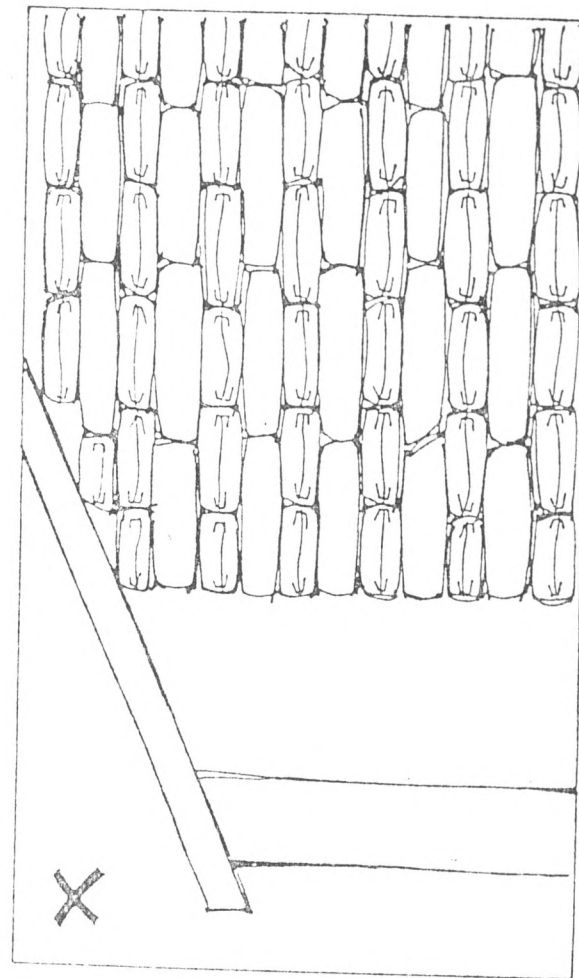


Too close to, and over the roof beams.

9. Stacks should not normally be built above roof beams or too close to the roof.



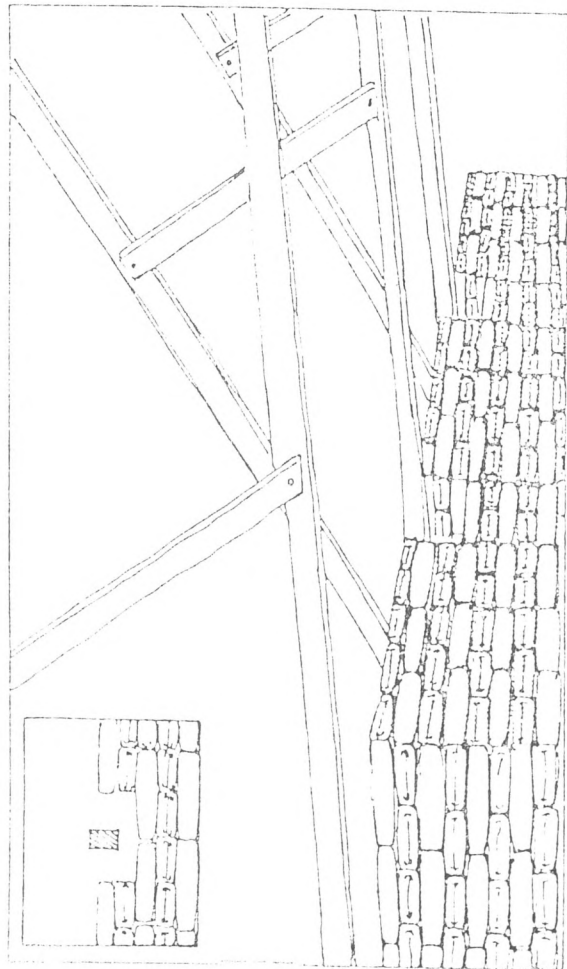
Correct stacking



Too close to the roof.

In exceptional circumstances, stacking between the roof beams may be done, to allow for temporary overloading of cereal grains.

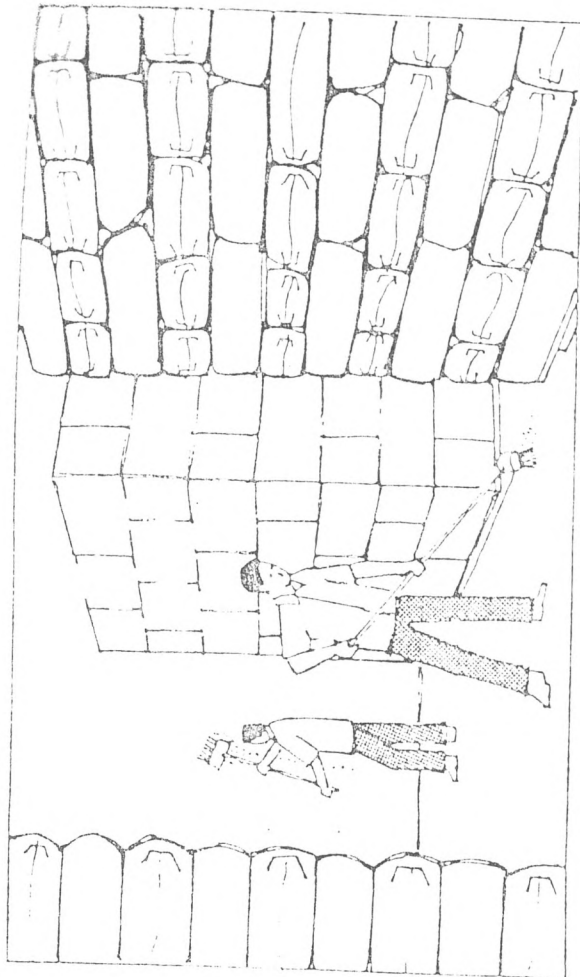
This can be done by stacking up into the roof space, leaving channels in the produce for the roof beams.



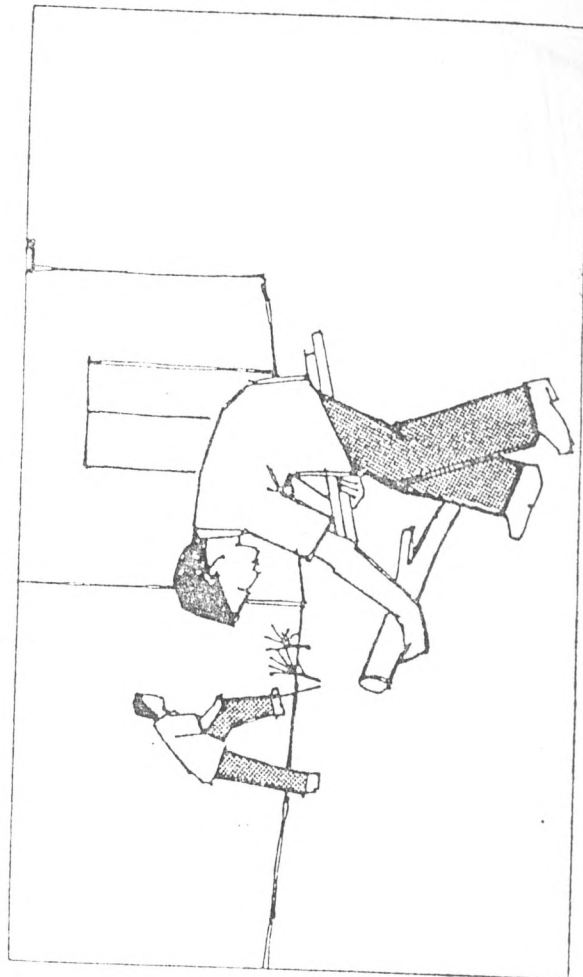
Channels left for roof beams.

7. STORE CLEANING

The store should be kept clean and tidy both inside and outside.



Clean inside.

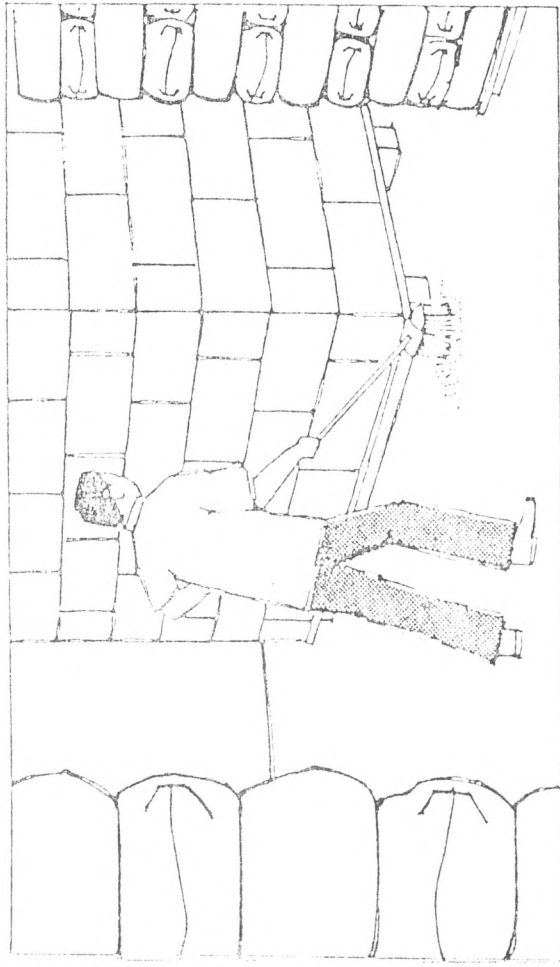


Clean outside - inside and outside.

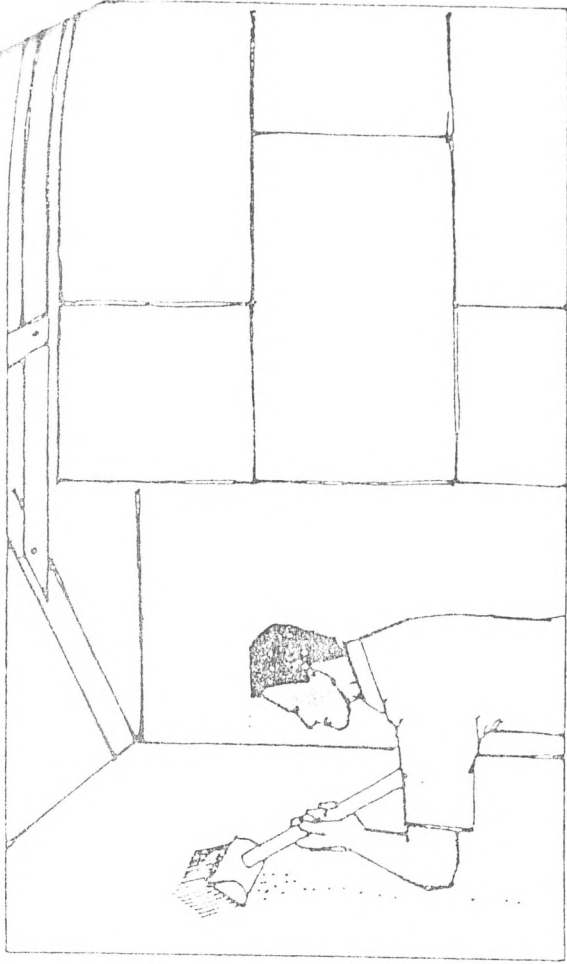
10. Unloading

When breaking down a stack, lift down the bags or boxes carefully, do not throw or drop them.

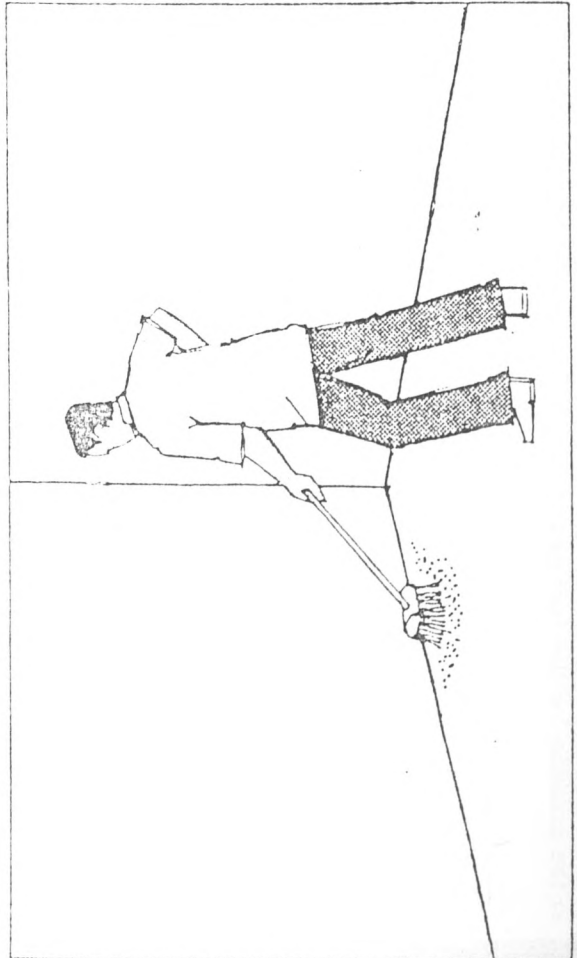
Clean, tidy stores help in the control of pests.
These things are important



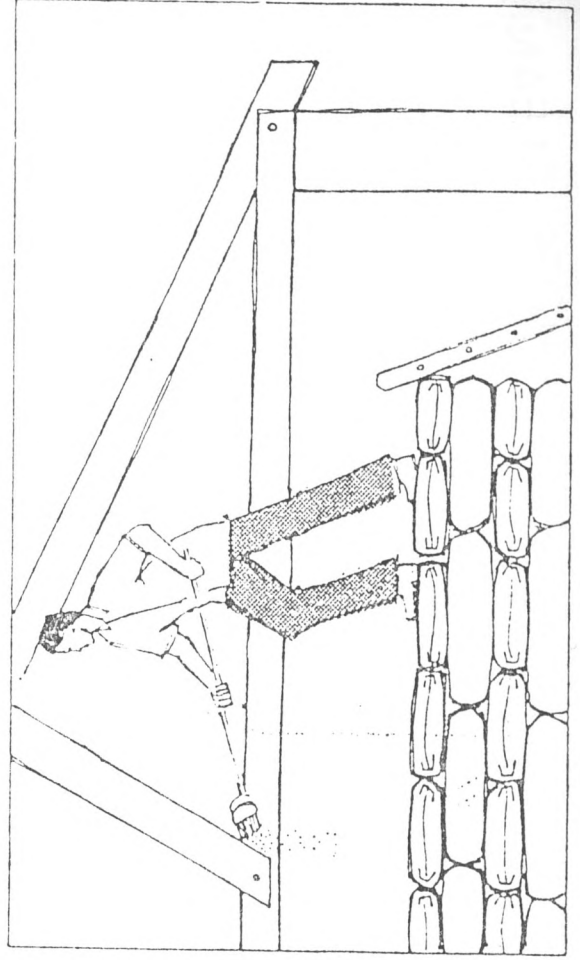
Keep the floors clean.



Keep the walls and the sides of stacks clean.



Thoroughly clean wall/floor joints and all corners.



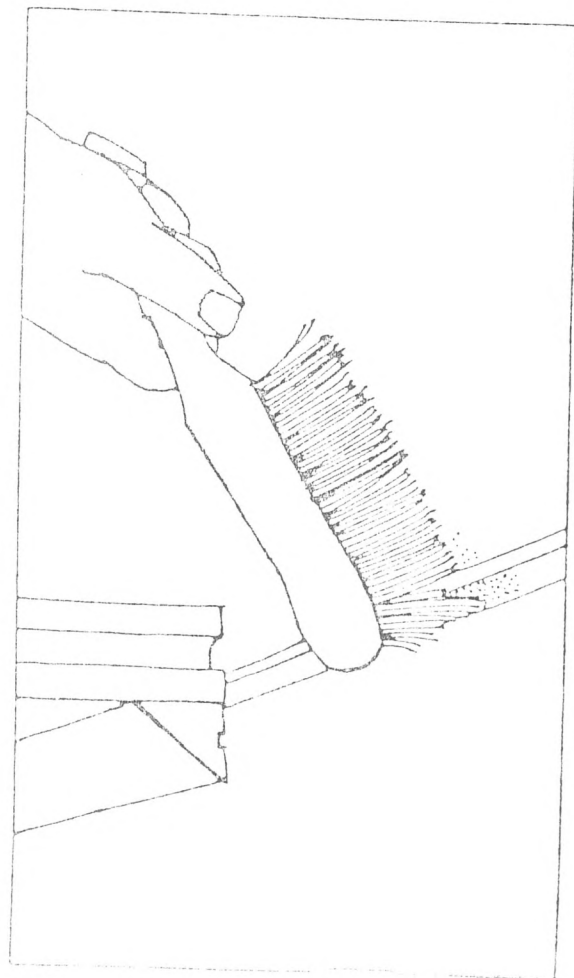
Clean roof beams and tops of walls.

8. INSPECTION

Inspect the store and food stacks at least once each week so that prompt action can be taken to prevent losses.

Inspection of food stocks

You should look for:



Clean doors and door channels.

The cleaning sequence for the whole store should be:

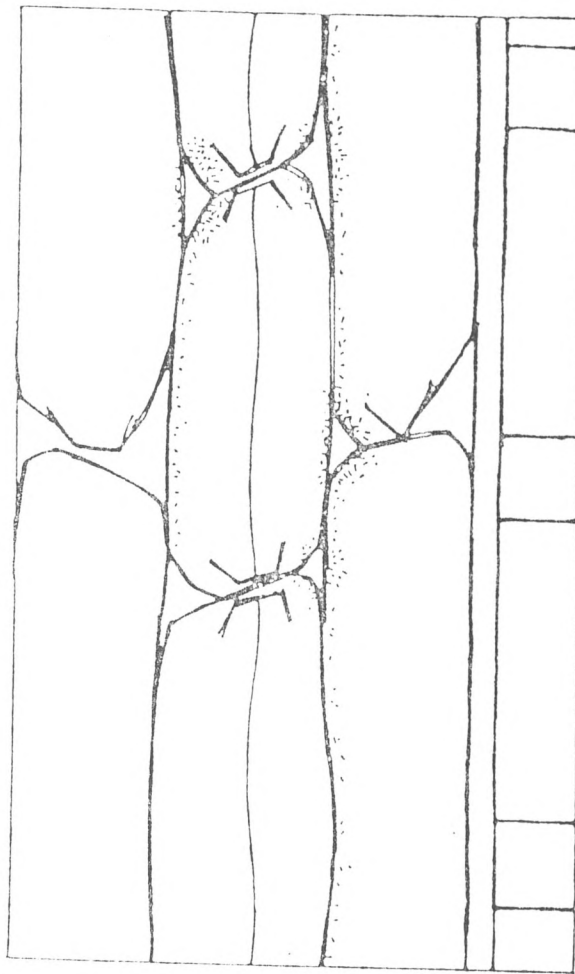
- from the top to the bottom of the store
- from the farthest point inside the store to the doorway

If walls and floor have been sprayed with insecticide, do not brush unnecessarily, as this will remove it. Regular removal of spiders' webs and other loose dirt will avoid the need for hard brushing.

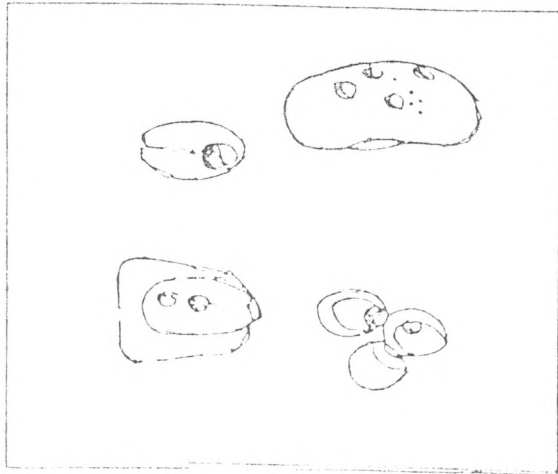
Thoroughly clean the store when it becomes empty.

Cleaning schedule

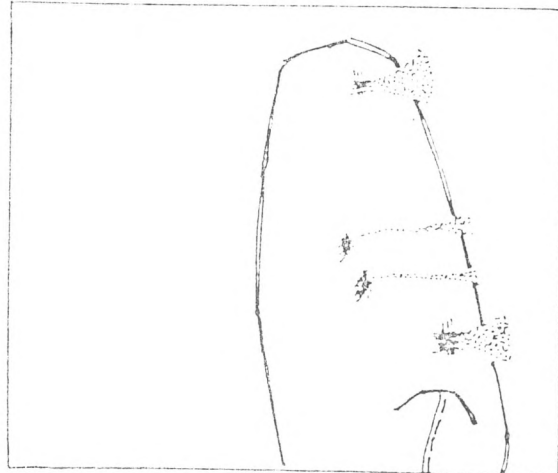
- At the end of each day sweep the floor and remove sweepings.
- At the end of each week clean the walls and stack sides.
- At the end of each month clean the whole store thoroughly.



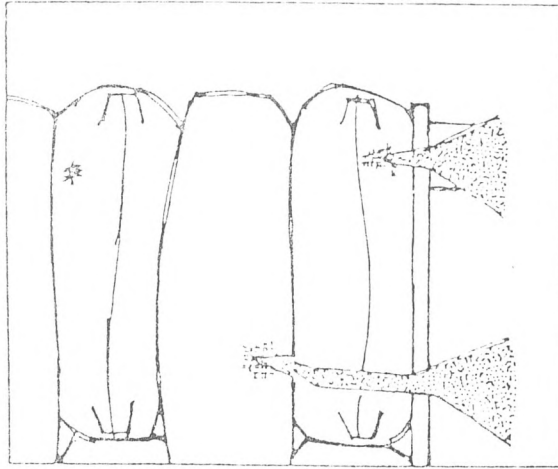
Insects, webbing and cocoons.



Insect damage.



Damage by rats, mice and birds and careless sampling.



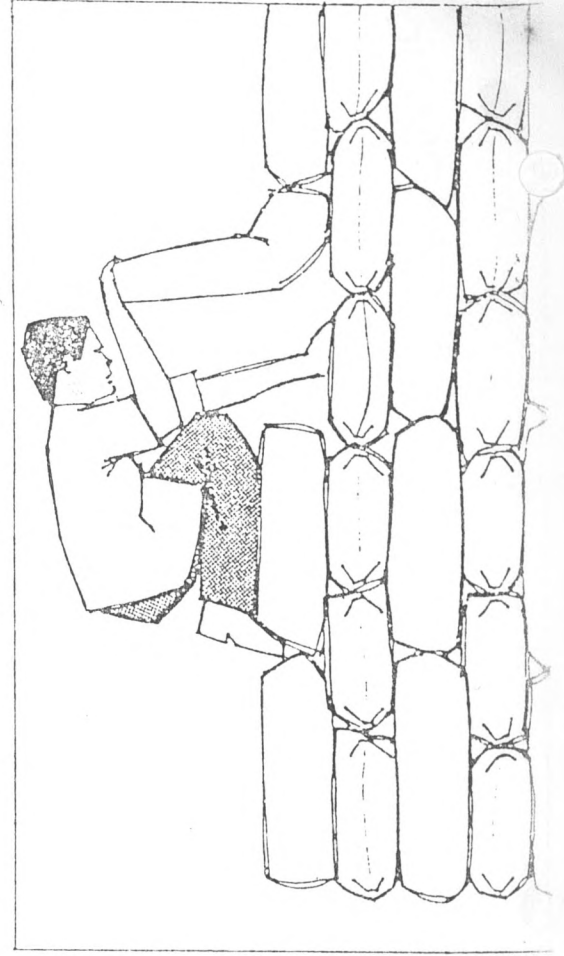
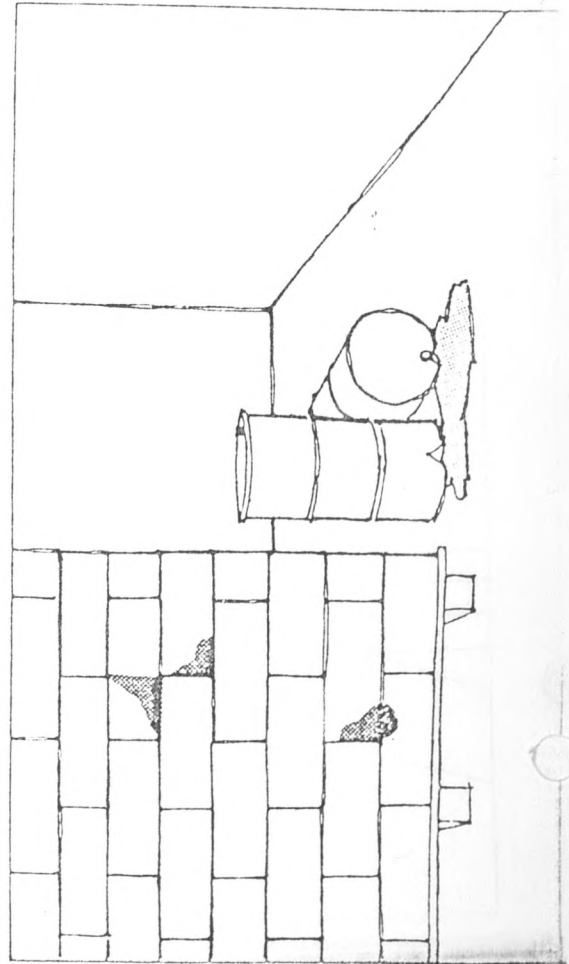
Split and broken sacks.

Check the stack for water damage, mould and caking (hardening), and discoloured or stained bags.

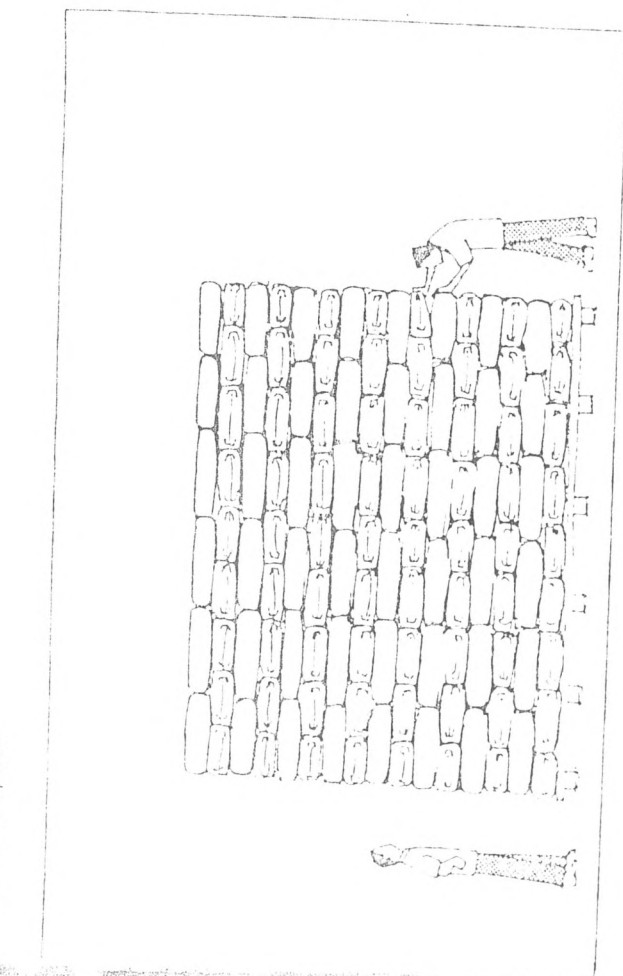
Check canned food for cans beginning to swell or rust.

Look for signs of theft (broken and partly open packs and leaking sacks).

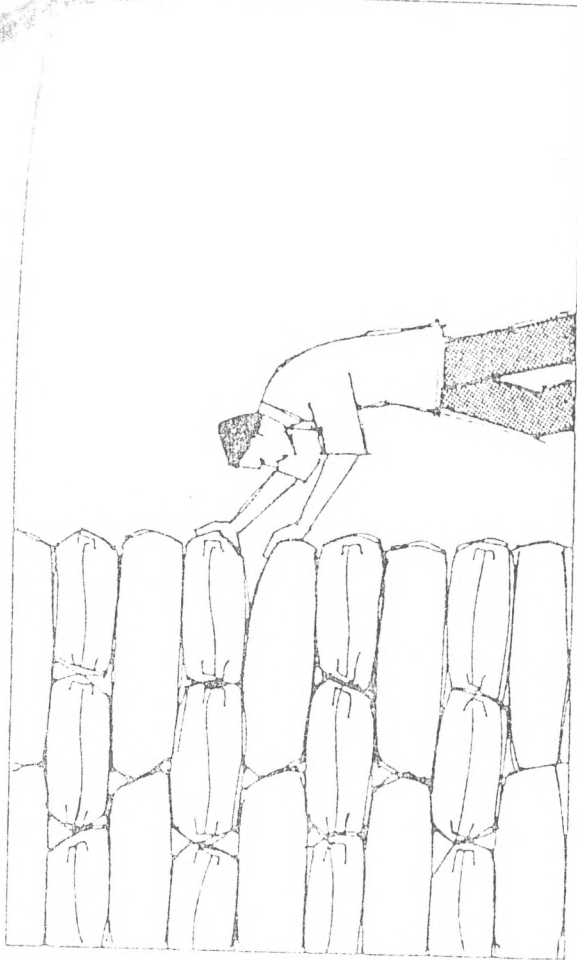
Check stored grain for signs of heating by:



Where to inspect

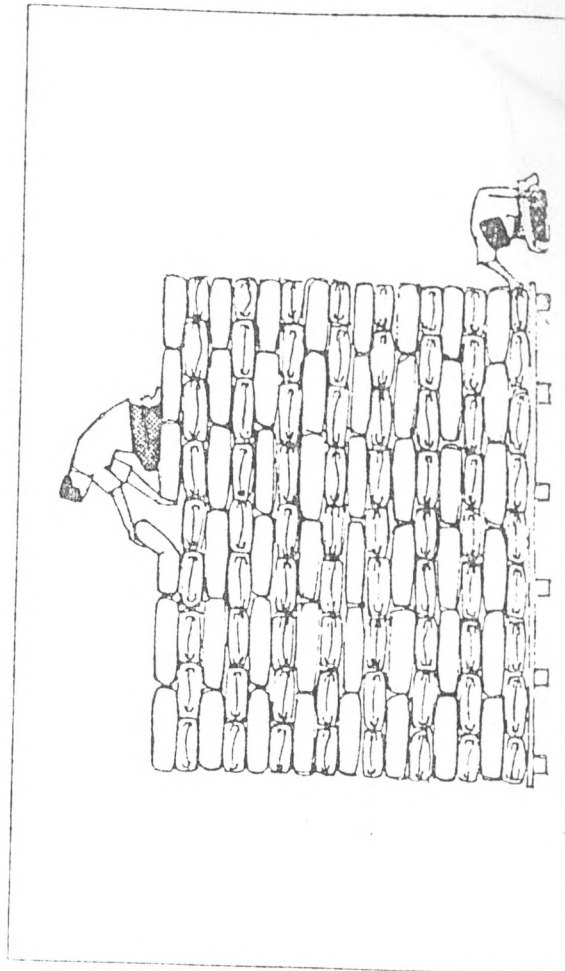
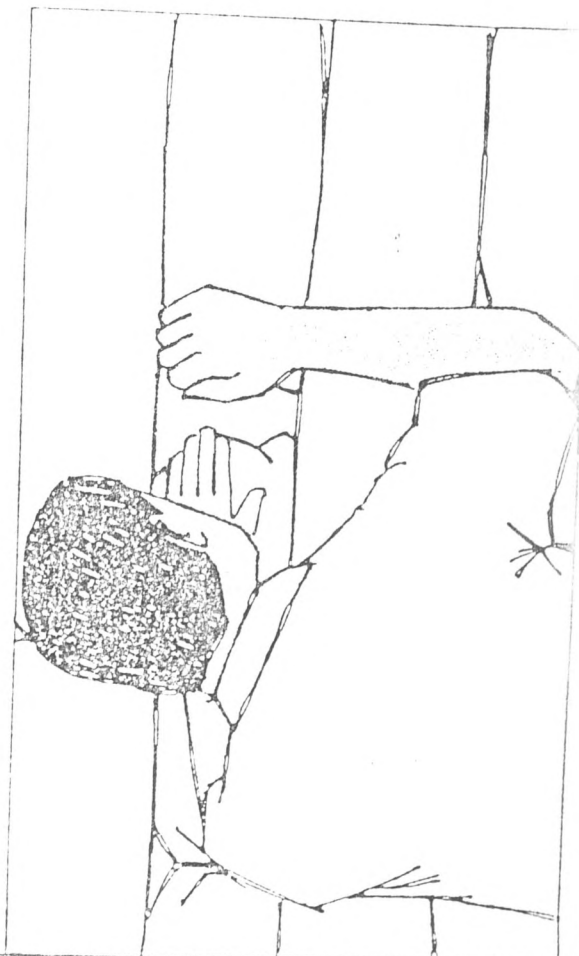


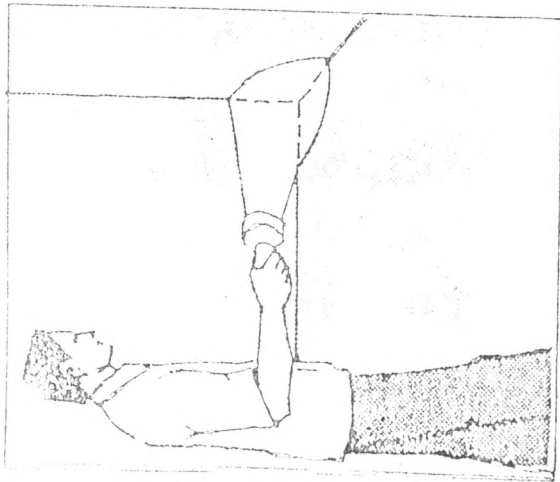
All around the sides of a stack.



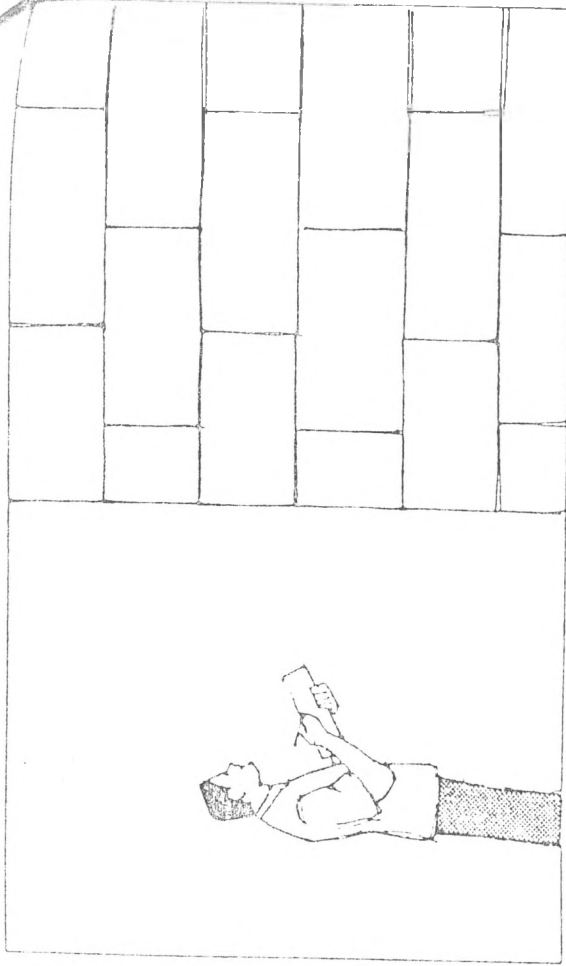
At corners, push up bag slightly and look for insects.
(Take care you do not push over the stack)

At the top of the stack: lift some of the top bags or boxes — look underneath for insects and other signs of damage.





Check in dark places using a good torch.



Make notes of what you find and where you find it during the inspection — do not forget to record the date.

Make records in a notebook kept in the store, or on a record card hung on the stack or the wall.

If you find anything wrong deal with it according to the instructions you have been given, or ask for instructions.

Reporting of inspections

See Appendix 1.

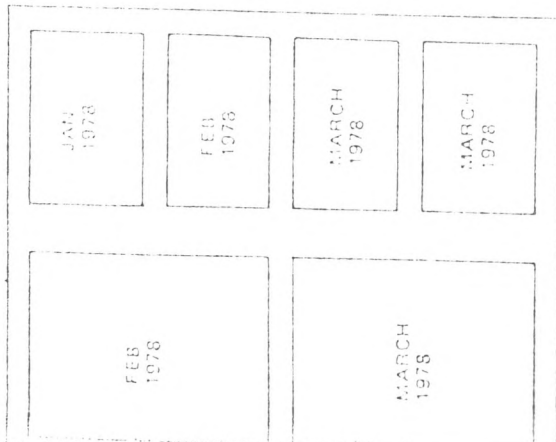
Inspect the store for:

- leaking roofs
- broken windows and ventilators
- badly fitting doors
- cracked walls and floors
- signs of entry by rats and mice

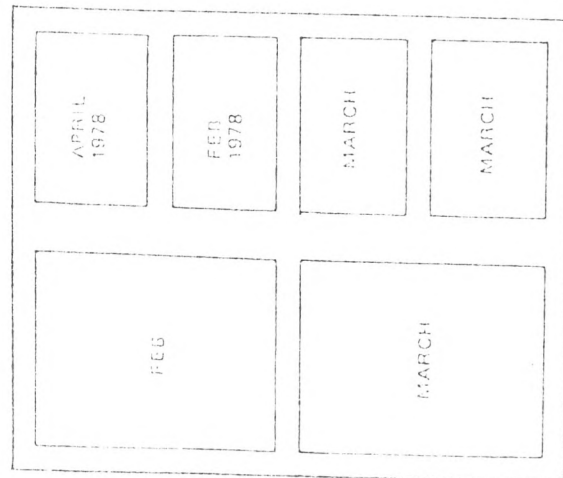
Inspect the outside of the store and the area around it.

9. STOCK ROTATION

First in, first out, is a well known rule for stock keeping. Well-planned stacking makes this rule easier to apply.



Issue first the stock which arrived in January.



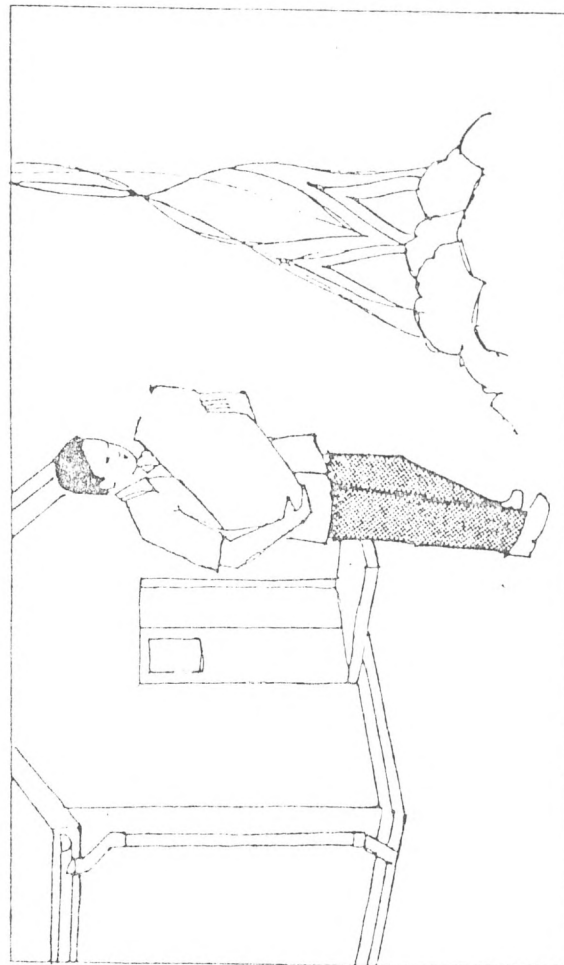
New stock arriving in April should then be stacked in the space left by the January stock.

packages are damaged, infested or damp, you should issue these without delay to stop further loss, even before older stock, provided they are fit to be eaten.

10. WASTE DISPOSAL

All dirt and rubbish should be destroyed each day by burning, or through the garbage disposal system if one exists.

Small quantities of dirty spillage, which are unfit to eat, should also be destroyed.



Burn rubbish away from the store.

Disposal of spoiled commodities

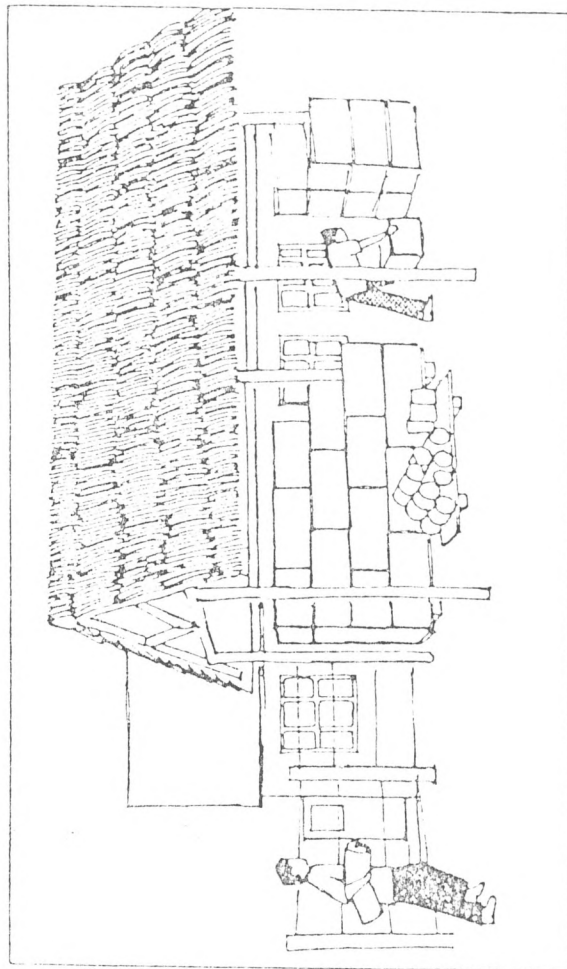
If the storekeeper thinks that part of the food in his store is unfit to eat, he should report this at once to the Project authority. His report should state the kind of food, how much of it is damaged and in what way.

A representative of the Project authority or a WFP officer may examine the spoiled food. If necessary the storekeeper should hand over a sample of the spoiled commodity for laboratory analysis.

Food which is spoiled and cannot be eaten should be destroyed by burning or through the garbage disposal system if one exists.

11. STORAGE AND DISPOSAL OF CONTAINERS

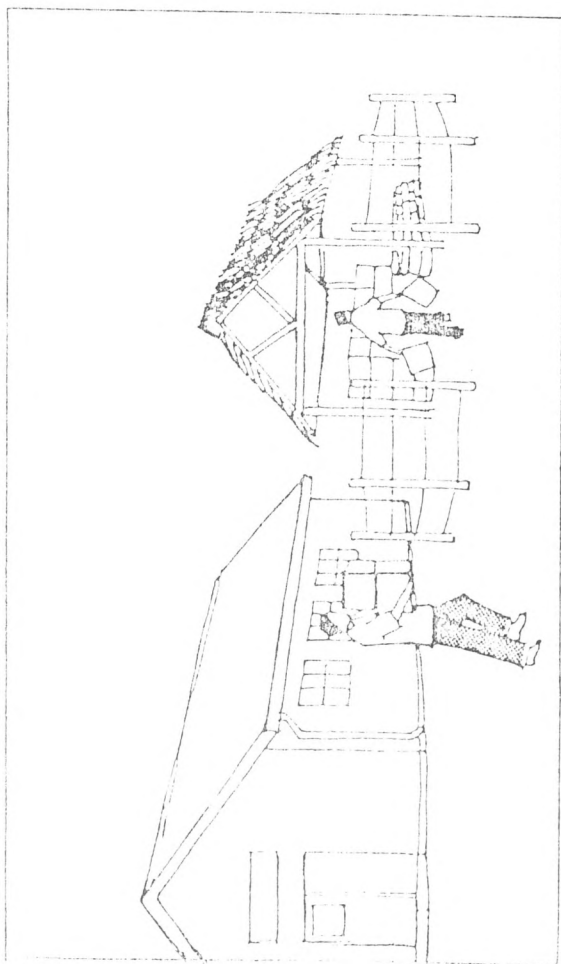
Empty sacks, cartons, boxes, cans or bottles should be stored in such a way that they do not give a hiding place for insects, rats and mice.



Where possible, place them in a separate store.

The Project authority will give you instructions about the disposal of containers.

Remember, some packaging materials can be sold in accordance with approved procedures.



Spoiled food is best kept in a separate store or under cover.

If the spoiled food is heavily infested with insects, it should be treated by qualified experts to prevent further damage.

The storekeeper should not dispose of the spoiled commodity until he receives instruction to do so from the Project authority. Authorization and approval of the method of disposal must be given by the resident WFP officer. Once instructions for disposal have been received, action should be taken as soon as possible.

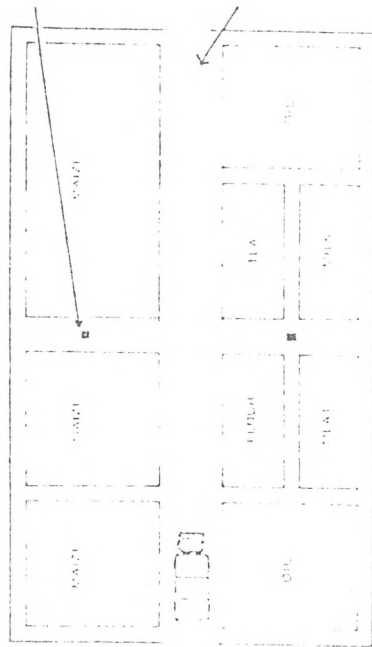
Remember spoiled commodities are still in the charge of the storekeeper until properly disposed of.

12. PEST CONTROL

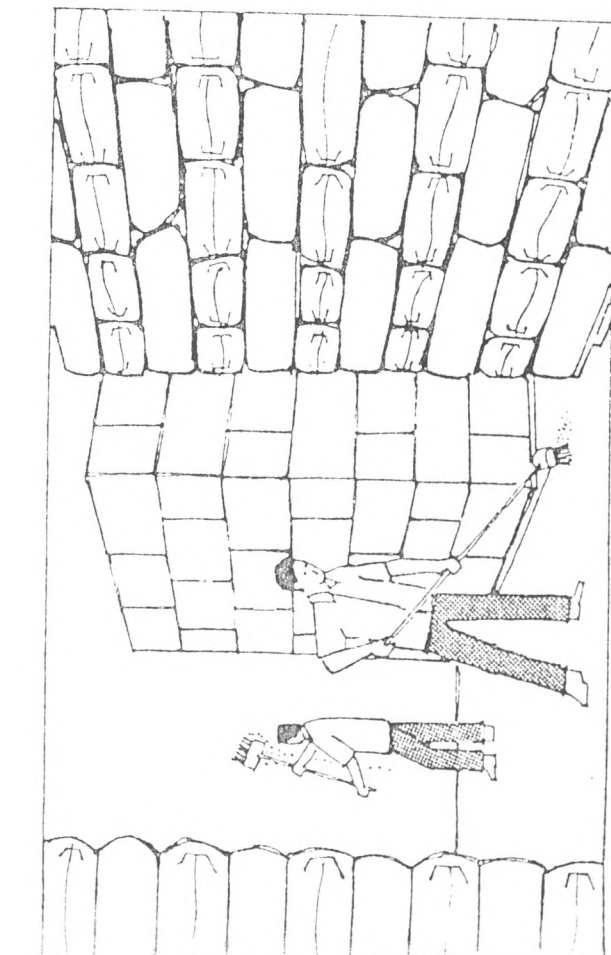
Insecticides, rodenticides and fumigants to control insects, rats and mice should only be used by trained staff.

Regular inspections will give early warning of attack by these pests and the need for control.

Pesticide application methods are not discussed in this handbook but storekeepers should know the following things.

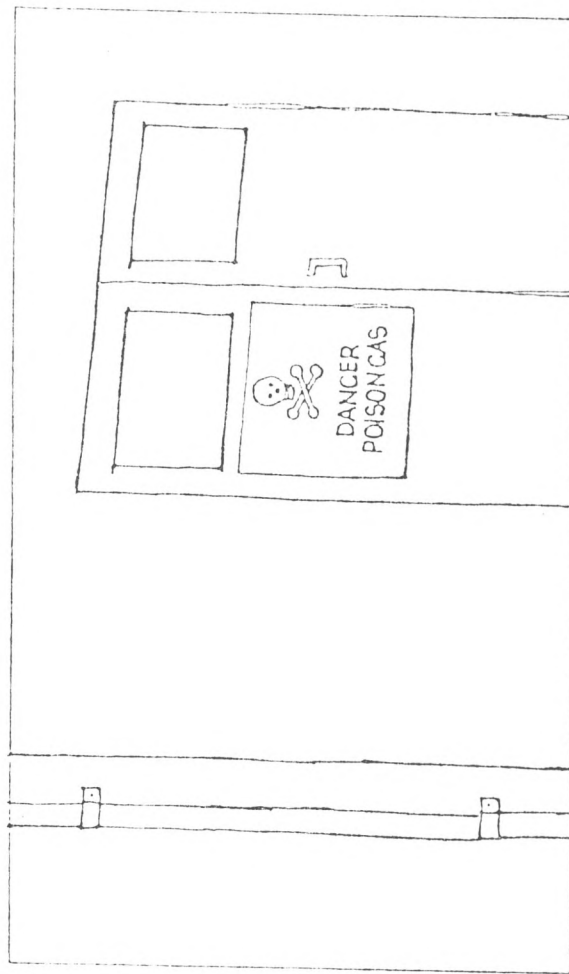


3. All people not engaged in the pest-control treatment should be kept well away from the treatment area.



The store must be cleaned before spraying or fumigation treatments.

Stacks must have enough space around and between them for pest-



4. When fumigation is used, warning notices should be prominently displayed.
5. Instructions given by pest-control teams should be strictly obeyed.
6. Chloride bags for pest control should be kept in a separate locked

13. ACCOUNTING AND RECORD KEEPING

Storekeepers should make regular stock counts, at least once every three months.

All receipts and issues should be properly recorded.

For any commodity lost, or declared unfit as food (whatever the cause) and recommended for destruction:

Record: the quantity;
the reasons for its destruction;
and the method used to destroy it.

These must be properly recorded and relevant condemnation certificates attached to your reports.

Full and accurate records must be kept of all stocks, all inspections and all pest-control treatments.

In addition to the general stock record, a record card should be attached to each stack giving details of:

date of receipt and quantity;
date of issue and quantity;
the running total in the stack.

Useful details of pest-control measures carried out on that stack should be written on the back of the card.

A stack record card is shown in Appendix 2.2.

If local food-stock recording procedures make requirements different from those given here, the local procedures should be followed.

14. SUMMARY OF ROUTINE PRACTICES IN STORES

Practice

Inspection of food commodities on arrival

Every consignment received, not less than weekly

Inspection of the store

Not less than weekly

Inspection of infestible food stocks, e.g., grain, flour, pulses, dried fish, dried fruit

Not less than weekly

Inspection of non-infestible stocks, e.g., canned oil, meat and fish, etc.

Not less than monthly

Store cleaning

Floor sweeping

Each day when the store is in daily use (at least weekly)

Cleaning walls and stack sides

Weekly

All around cleaning, both inside and outside the store

Monthly

In large stores with permanent storekeepers, a security inspection of stocks should be made daily. For signs of insect and rodent infestation and other spoilage, thorough inspections should be made as listed above.

REPORTING OF INSPECTIONS

Reports should include:

1. The name of the storekeeper.
2. The name and address of the store.
3. The Project number (if there is one).
4. The dates of inspections carried out.
5. Details of commodities held in store:
 - a) The quantity of each
 - b) Receipts and issues for the month under report.
6. Concise details of what you found during your inspections: (such as faults with the building, damage or infestation found in the food stocks).
7. Full details of repairs and any pest-control treatments which have been carried out, and any requested but NOT carried out. Say why, to whom and when you reported the matter.

When your report is completed, send it without delay to your senior officer or the person responsible for taking action. Keep a copy of the report for your own records.

An example of an inspection record and report form is given on the next page.

STORE INSPECTION RECORD SHEET AND REPORT FORM

Are there live insects on the walls and floors?

Is there evidence of rats or mice inside or outside the building, e.g., signs of gnawing, rat or mouse droppings, rat or mouse holes?

Are there any other matters which need attention, e.g., security of store, access, condition of site, damaged storage machinery, etc.?

Commodity Inspection Report

_____ have inspected the store at (address) _____

Project number

signed ...
(Storekeeper)

(Storekeeper)

name of storekeeper (Block capitals)

Store Building Inspection Report

weather at time of inspection: raining/dry; * sunny/overcast; * windy/calm *
degree of loading: full/75%/50%/25%/empty *

total volume/capacity of the store:

Condition of building: _____
(good/fairly good/poor)

Repairs needed

of G/F/P

G/F/P

poor G/F/P

G/F/P

Windows G/F/P

Ventilators G/F/P

ights G/F/P

Record of pest-control treatments:

STACK RECORD CARD

Turn over

[illegible]

BASIC TOOLS AND EQUIPMENT FOR USE IN STORES

Appendix

RECOMMENDATIONS FOR THE STORAGE OF PARTICULAR COMMODITIES

Commodity	Commonly used packaging	Recommendations
Cereals — whole grain		
Wheat	Jute and plastic woven sacks	Repair damaged sacks immediately or rebag into clean sacks. Inspect every week for insects and for signs of rats and mice. When these are found, take immediate action or report to the responsible authority.
Maize		
Sorghum		
Barley		
Oats		
Cereals — milled		
Wheat	Jute, woven plastic or cotton sacks	Keep separate from other cereal commodities. Repair damaged sacks. Inspect every week for insects and for signs of rats and mice; take immediate action when these are found. Do not use insecticides on milled cereal flours in bags. They should not be fumigated more than once with methyl bromide.
Corn meal		
Roller oats		
Rice		
Bulgar wheat		
Blended foods		
Corn soya milk (CSM)	Paper sacks with plastic liners	Inspect carefully for damage on arrival; use any broken sacks first. Store in the coolest part of the store. Use within 12 months. If infested with insects, get expert advice before fumigating.
Instant (CSM)		
Wheat soya blend (WSB)		
Rison		
Defatted soya flour		
Soy-fortified corn meal		
Soy-fortified roller oats		
Soy-fortified sorghum grits		
Soy-fortified wheat flour		
Soy-fortified bulgur wheat	Woven plastic sacks	
Dairy products		
Dried skim milk (DSM)	Paper sacks with plastic liners	Inspect for damage when received and use up any damaged sacks first. Keep the sacks in a cool, dry area away from strong-smelling foods, and keep the outside of the sacks free from milk-powder dust. Inspect regularly and use up any powder which is starting to become hard (caking). Look for signs of rats and mice when inspecting and take action if they are present in the store.
	Small plastic packs in fibreboard boxes	The same as for paper sacks; inspect inside any boxes showing signs of

Commodity	Commonly used packaging	Recommendations	Commodity	Commonly used packaging	Recommendations
Dried whole milk	Cans in fibreboard boxes	Use up any damaged cans immediately and store the remainder in a cool place.	Stockfish	Jute bales	Remember that salt fish can go bad and must not be kept in the stack for longer than three months. Prevent it from dampness. If necessary cover the stack with a waterproof sheet or tarpaulin to protect it during wet weather. Inspect regularly for signs of spoiling and remove and destroy any obviously spoiled fish immediately.
Sweetened condensed milk	Cans in fibreboard boxes	Inspect carefully when received and take out any cans which are damaged and leaking. Report any trouble with swollen ("blown") cans you see at a later date; do not issue blown cans unless you have been told that it is safe to do so. Store in cool dry areas — do not store them too near the roof. If stored above 25°C, use within 14 months (ask for guidance on this).	Fish protein concentrate	Paper sacks, lined Small plastic or foil packs in fibreboard boxes	Stack separately from other commodities because of its strong smell. Inspect regularly for insects and take immediate action to have the fish fumigated if insects are found.
Evaporated milk	Cans in fibreboard boxes	Take out any leaking and damaged cans on arrival and distribute them straight away.	Fruit	Fibreboard or wooden boxes	Inspect very carefully when you receive them and use any damaged packs immediately. Keep separate from other commodities. If infested they may be fumigated, but obtain expert advice.
Cheese	Cans in fibreboard boxes	Inspect carefully when received; remove any cans which are damaged and leaking. Inspect regularly and report any trouble with blown cans you see at a later date; do not distribute blown cans unless you have been told that it is safe to do so. Store in a cool dry place; do not store them too near the roof. Use within six months if stored at tropical temperatures.	Dried fruit	Cotton bags in a jute sack	Do not stack cases more than eight high. Inspect regularly for insect, rat and mouse attack. Surface sprays of insecticide may be used on the surface of stacks of cases, as a means of preventing attack by insects.
Dried eggs	Cans in fibreboard boxes	Use damaged cans immediately. Keep in a cool part of the store.	Dates	Cans in fibreboard boxes	Inspect carefully at the time of receipt and remove any cans which are damaged and leaking. Inspect regularly and report any trouble with blown cans unless you are assured it is safe to do so. Store in cool dry areas and do not expose to high temperatures; do not store too near the roof.
Milk tablets	Plastic or foil pouches in fibreboard boxes	Use any damaged packs immediately. As these are items which attract pests, keep in secure storage.	Dried pears	Some jam in glass jars	
Meat and fish	Tin or aluminium cans in fibreboard boxes	Inspect carefully when received; remove any damaged or leaking cans. Inspect them regularly and report any trouble with blown cans — do not issue blown cans unless you are assured that it is safe to do so. Store in a cool dry place and do not store them too near the roof.	Canned fruit		
Canned meat			Jam		
Canned fish			Beverages	Plywood chests with foil liners	Store in a dry place away from strong-smelling foods.
			Ten	Jute sacks	Store in a dry place away from strong-smelling foods. Inspect occasionally for insect infestation.
			Coffee (beans)		
Dried salt fish	Wooden boxes, fibreboard cases or jute bales	Stack separately from all other commodities because of its strong smell. If possible use a separate store, but ensure that this store is dry and can be well sealed.	Coffee (soluble)	Multilayer (plastic, paper, foil) bag in fibreboard case	Use any damaged packs immediately. This is an item which attracts pests.

Commodity	Commonly used packaging	Recommendations
Miscellaneous Peas and beans	Jute or woven plastic sacks	Repair damaged sacks immediately. Inspect them weekly for signs of attack by insects.
Sugar	Jute, cotton or woven plastic sacks	Inspect on arrival, remove any wet sacks and store separately; repair damaged sacks. Store in a dry place.
Vegetable oil	Cans or plastic bottles in fibreboard boxes Steel drums	Separate out any leaking and damaged cans on arrival and distribute them immediately. Avoid rough handling of the cases of oil at all times. Do not stack too near the roof, nor to such a height that the bottom cans are crushed.
Margarine	Cans in fibreboard boxes	Separate out any leaking and damaged cans on arrival. Store in the coolest part of the store. Do not stack too near the roof.
Edible fat	Cans in fibreboard boxes	Separate out damaged cans on receipt and issue these first.

APPENDIX B

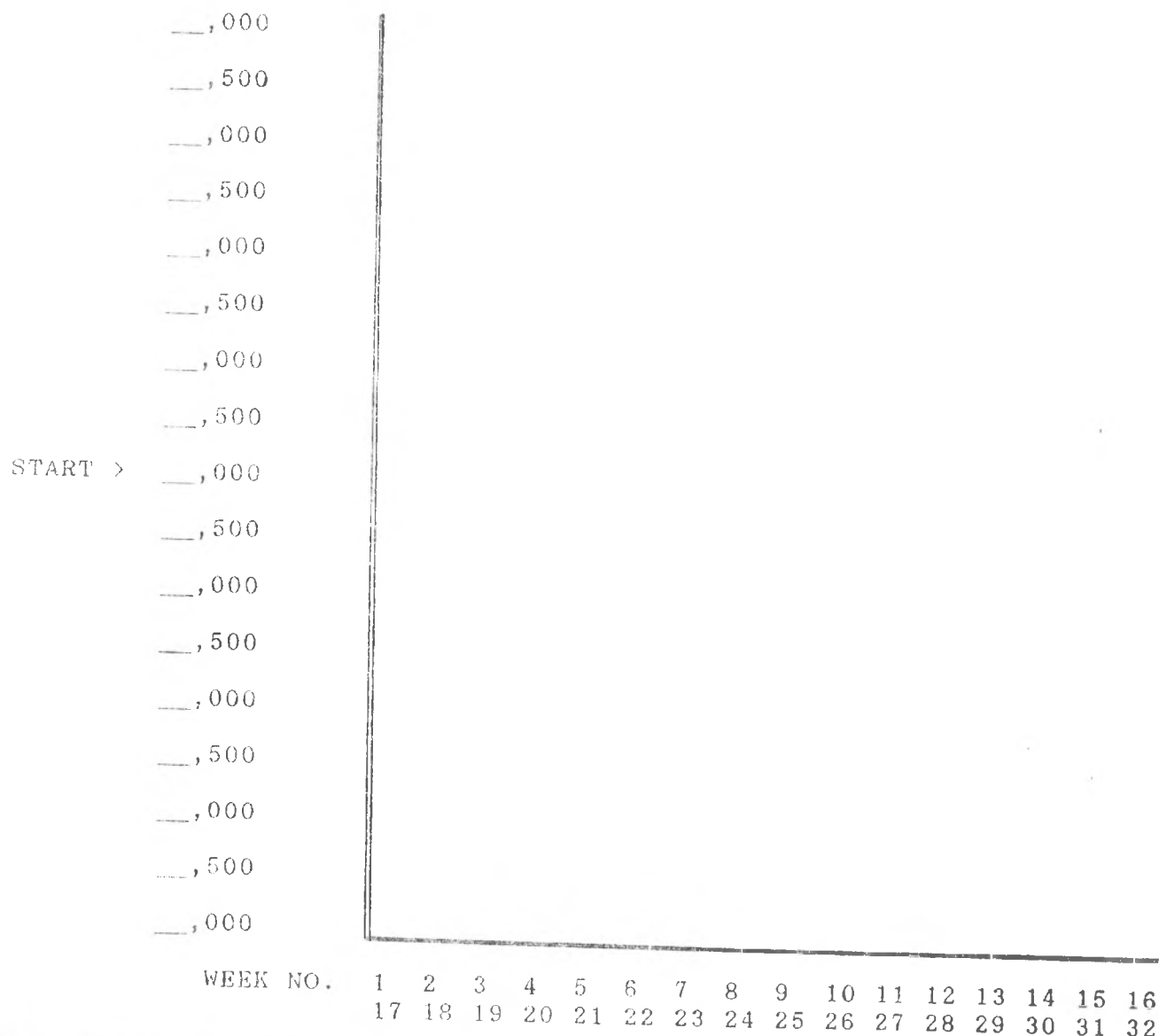
ANALYSIS OF MARKET PRICES FOR FOOD COMMODITIES

Commodity: _____

Name of Market: _____

Date Analysis Started: _____

PRICE
(In Ugandan Shillings)



Instructions: On first week, record the price for the commodity (to the nearest 500 shillings) at the Start Mark. Fill in the remainder of the prices above and below. When prices drop more than four weeks in a row, determine if food distribution is having a negative impact.

Note: Remember to adjust chart for inflation every two months.

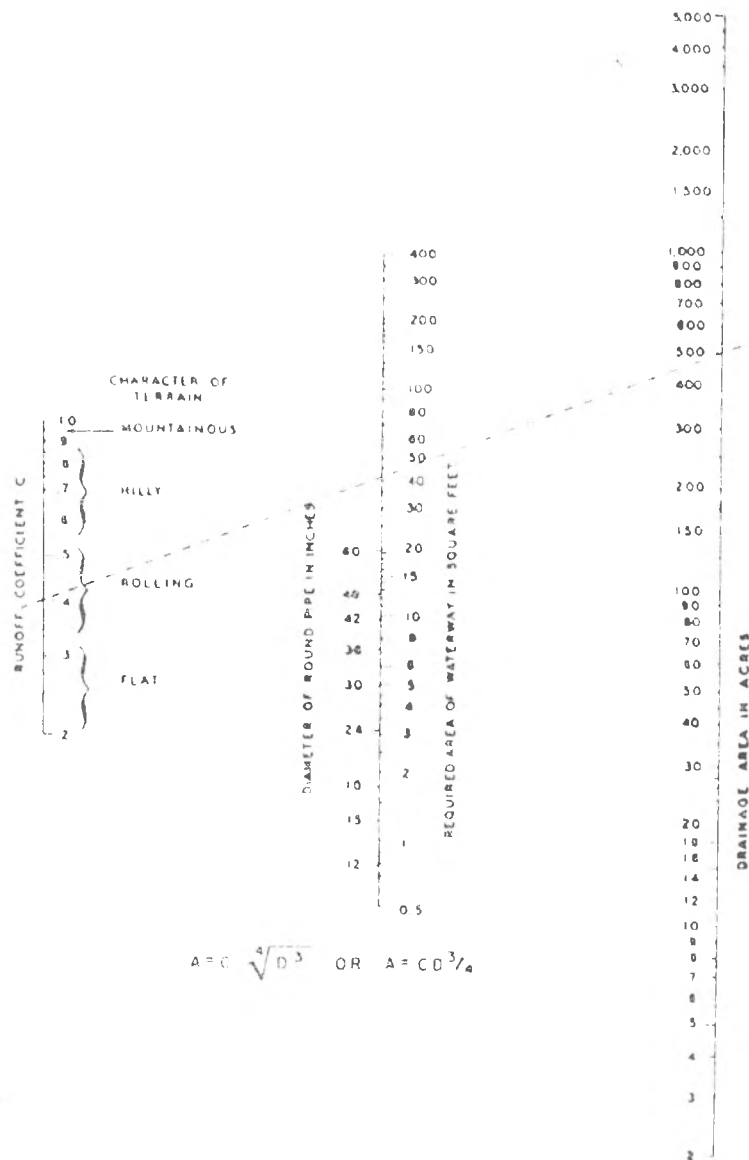
APPENDIX C

GUIDELINES FOR RURAL ROAD
CONSTRUCTION

12:4 Culverts

Culverts are required wherever roads are needed to cross drainage channels. Culverts must be designed so they do not impede the flow of water in the drainage system. To determine the proper size of the cross-sectional area of the proposed culvert, the following nomograph may be used. (For conversion to metric, see conversion tables in Section VII.)

FIGURE 12-6
Nomograph for Solution of Talbot's Formula



A=Area of culvert opening in square feet
C=Coefficient depending on character of terrain
D=Drainage area in acres

Example: The area of culvert for a drainage area of 500 acres in gently rolling terrain (coefficient C = 0.4) is 42 square feet (see dashed line above).

Culverts should be aligned so that the mouth is at a right angle to the centerline of the ditch. Culverts should be long enough to extend through fills to the point where the fill slope meets the ground. To minimize erosion, a headwall should be used on the upstream side, and the culvert should extend longer than needed on the discharge end (see Fig. 12-7).

Culverts should be located wherever natural drainage channels are large enough to require cross-drainage. On 8 percent grades, ditch-relief culverts should be placed about 300 feet (100 meters) apart; on 5 percent grades, they should be 500 feet (150 meters) apart (see Figs. 12-8 and 12-9). The bedding and spacing of pipes in multiple-pipe culverts is at least one-half the diameter of the pipe (see Fig. 12-10).

FIGURE 12-7

Culvert Extended Beyond Fill to Prevent Erosion

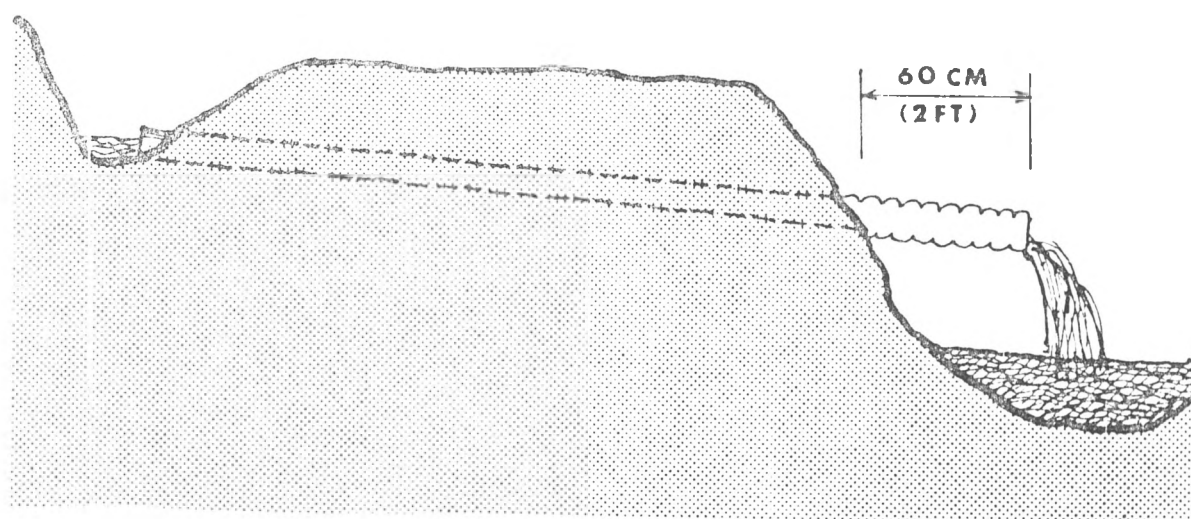


FIGURE 12-8
Ditch-Relief Culverts

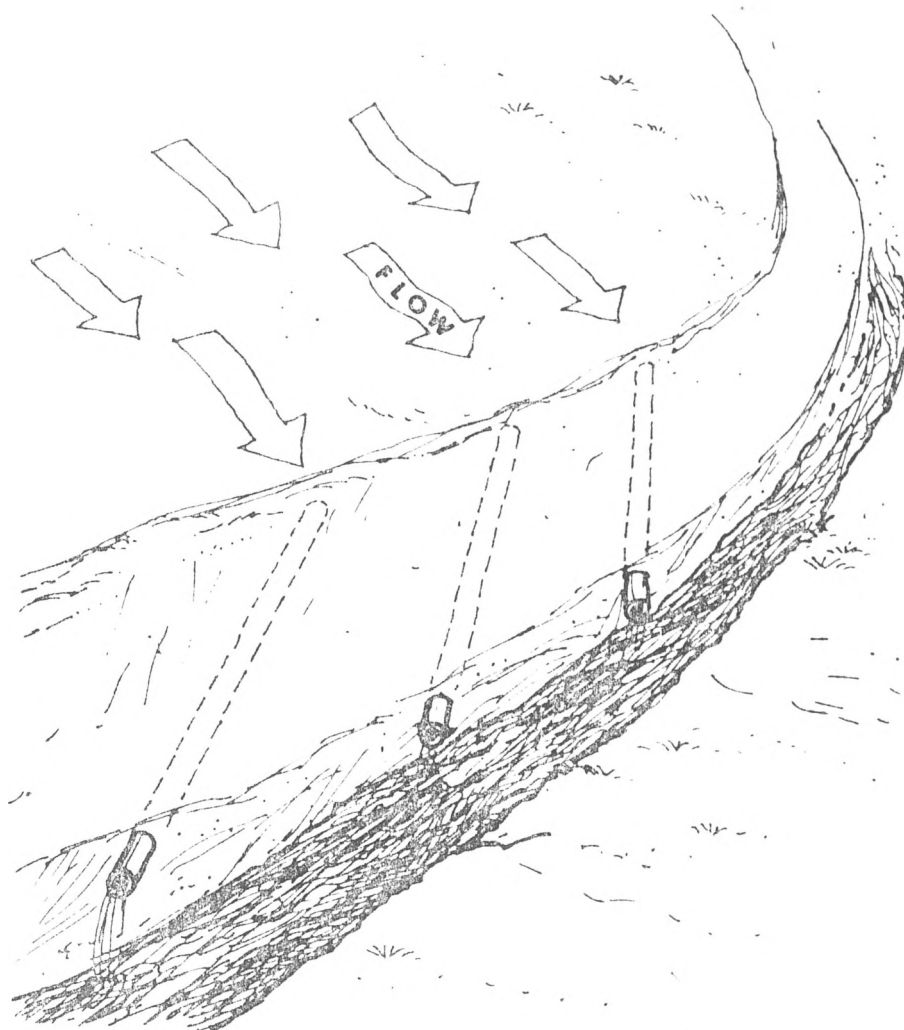


FIGURE 12-9
Culvert Spacing

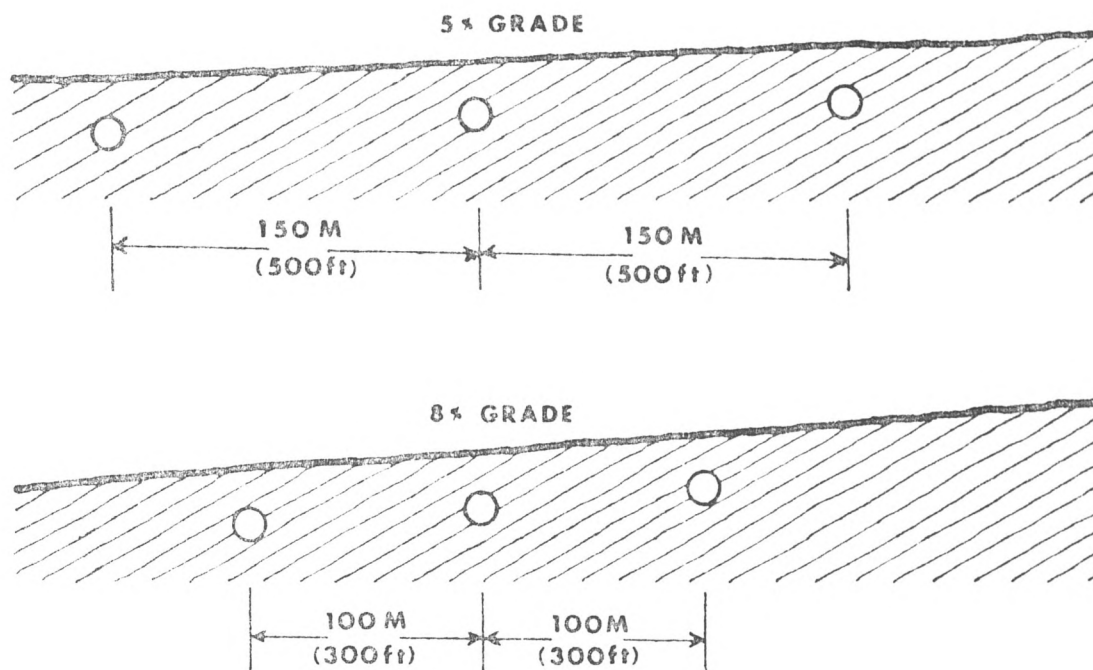
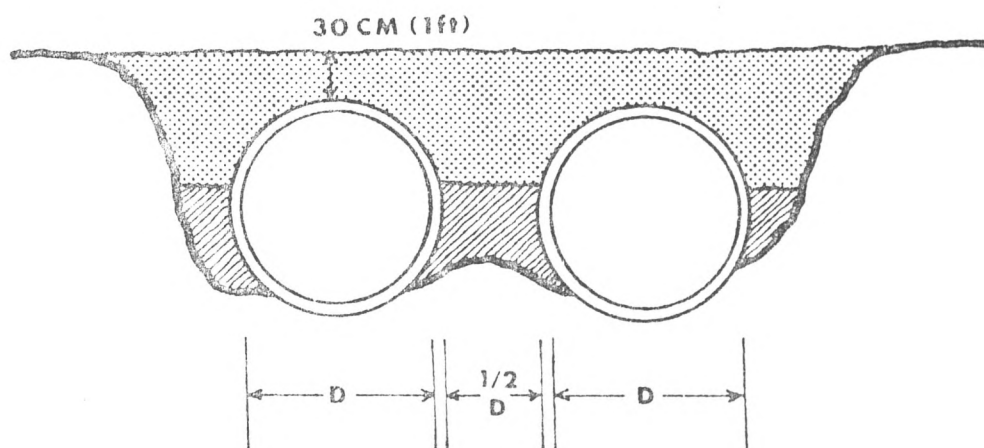


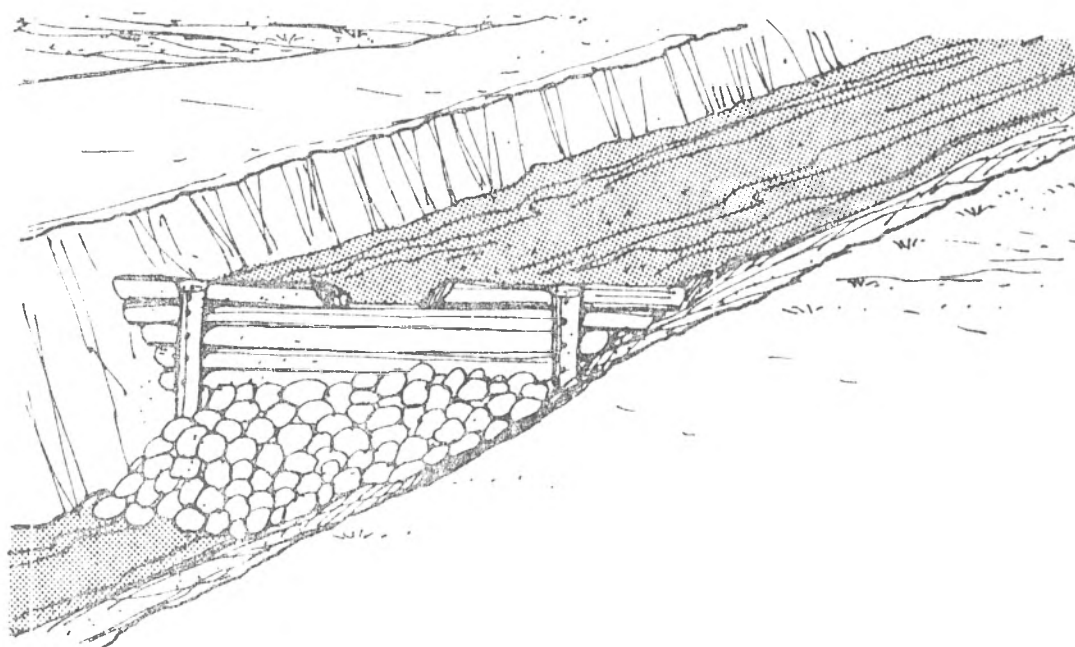
FIGURE 12-10
Spacing of Multiple-Pipe Culvert



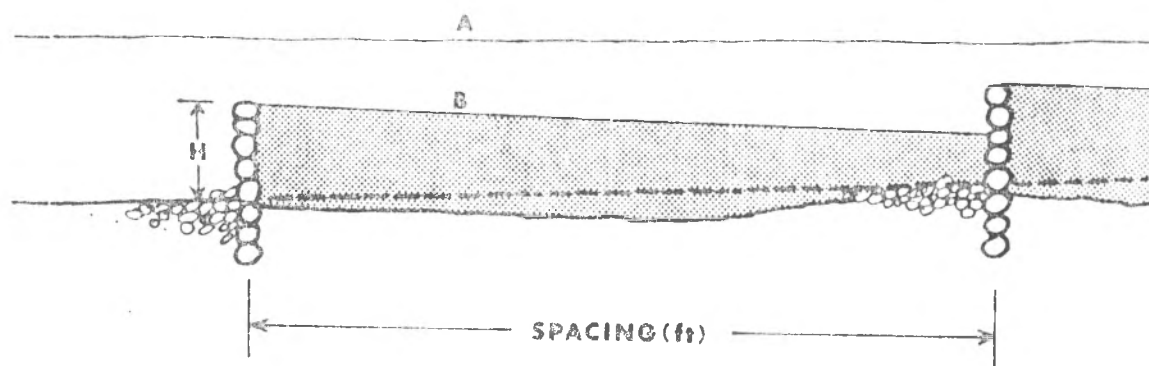
12:5 Check Dams

Check dams are used on sidehill cuts and steep grades, where they are placed in side ditches to slow the water and prevent it from washing out the road. Check dams are used when the ditchline grade exceeds 5 percent or where erosion is a problem. They are made of timber, sandbags, concrete, rock or similar materials. Fig. 12-11 shows a typical check dam construction and the usual method of computing check dam spacing.

FIGURE 12-11
Check Dam Construction



Computation of Spacing



$$\text{Spacing} = \frac{100 H}{A - B}$$

H is expressed in feet

A = % grade of centerline of road

B = % grade of proposed water surface

12:6 Run-off

The usual method of calculating run-off for a particular area combines judgment with calculations based on estimation. The formula is expressed as:

$Q = CIA$ where Q = run-off in cubic feet per second (CFS);

C = a coefficient that represents the ratio of run-off to rainfall (see Table below);

I = intensity of rainfall in inches per hour for the estimated time of concentration (from local estimates);

A = drainage areas in acres.

TABLE 1
Surface Run-off Factors

Types of Surface	Factor
Asphalt pavements	0.80 to 0.95
Concrete pavements	0.70 to 0.90
Gravel or macadam pavements	0.35 to 0.70
Impervious soils*	0.40 to 0.65
Impervious soils, with turf*	0.30 to 0.55
Slightly pervious soils*	0.15 to 0.40
Pervious soils*	0.01 to 0.10
Wooded areas depending on surface slope and soil cover	0.01 to 0.20

* For slopes from 1 to 2 percent.

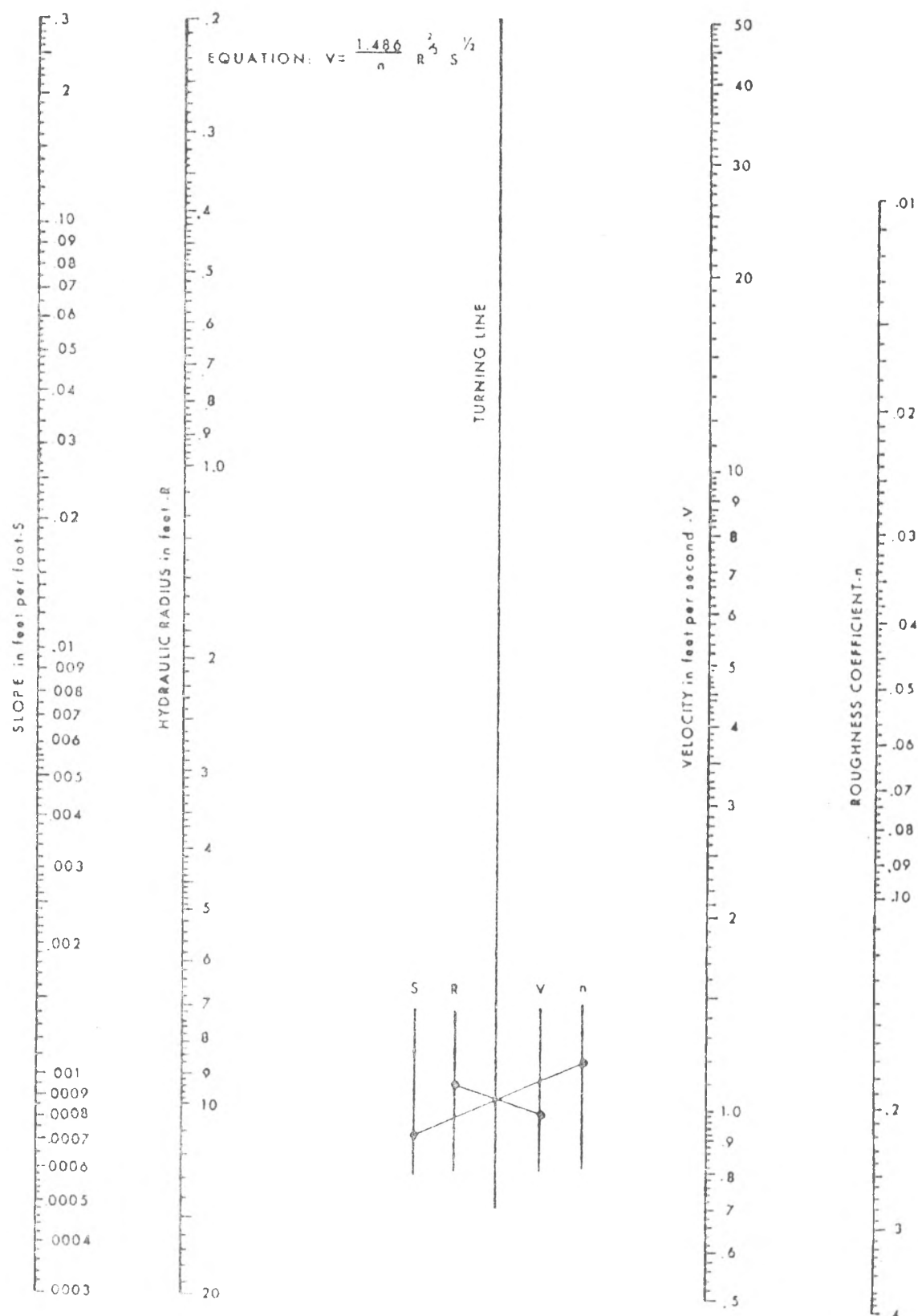
Note: The figures given are for comparatively level ground. For slopes greater than 1 in 50 (2%), the factor should be increased by 0.2 for every 2 percent of slopes up to a maximum 1.0.

12:7 Open Ditch Design

To determine the necessary size of a drainage channel, the following procedure should be used:

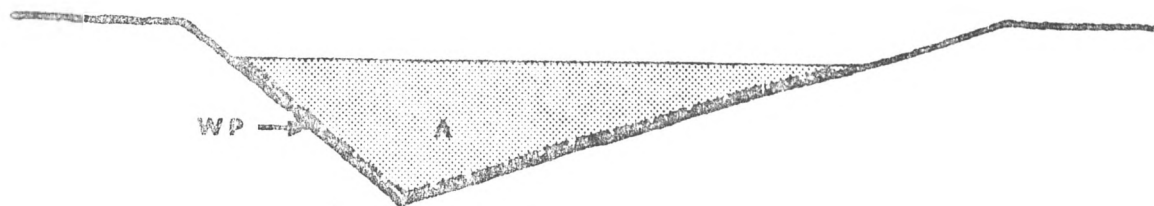
- Determine the rate of run-off (Q) in CFS from the area contributing to the ditch.
- Determine the slope (S) in feet per foot of the ditch from the grading plan of the area.
- Utilizing Appendix 3, select a retardance coefficient (n) and a maximum permissible velocity (V_{max}) in fps for the soil conditions in which the ditch is to be constructed.
- Determine the type of ditch to be used (i.e., non-symmetrical triangular, symmetrical triangular, or trapezoidal).
- Using the slope (S), the retardance coefficient (n), and velocity (V_{max}), determine the actual hydraulic radius (R) using the nomograph below:

FIGURE 12-12
 Nomograph for Solution of Manning Equation



- F. Calculate, using (R) and the type of ditch selected, the depth (d) and the area (A). Note Fig. 12-13.

FIGURE 12-13
Typical Ditch



$$R = \frac{A}{WP}$$

A = Area of flow
WP = Wetted Perimeter

- G. Calculate $Q = AV$ where A is the area as determined in (F) above and V is the velocity of flow as determined in (C) above.
1. If Q calculated is not greater or less than 5 percent of the run-off A, then the ditch can be used.
 2. If Q calculated is greater than 5 percent of the run-off Q, use the same ditch but with steeper side slopes and repeat (F) and (G) above. If velocity chosen was maximum for the soil, use lower velocity and repeat (E), (F) and (G) above.
 3. If Q calculated is less than 5 percent of the run-off Q and the velocity used was maximum for the ditch material, change the cross-section of the ditch by making side slopes flatter or by increasing bottom width if trapezoidal.
- H. As an additional safety factor, add 0.5 to the depth.

APPENDIX 1
Headwall Construction

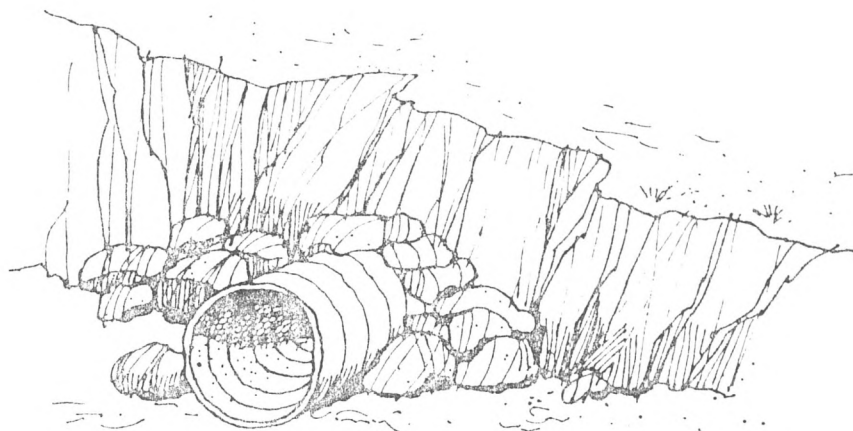


FIGURE 12-14a: Rubble headwall

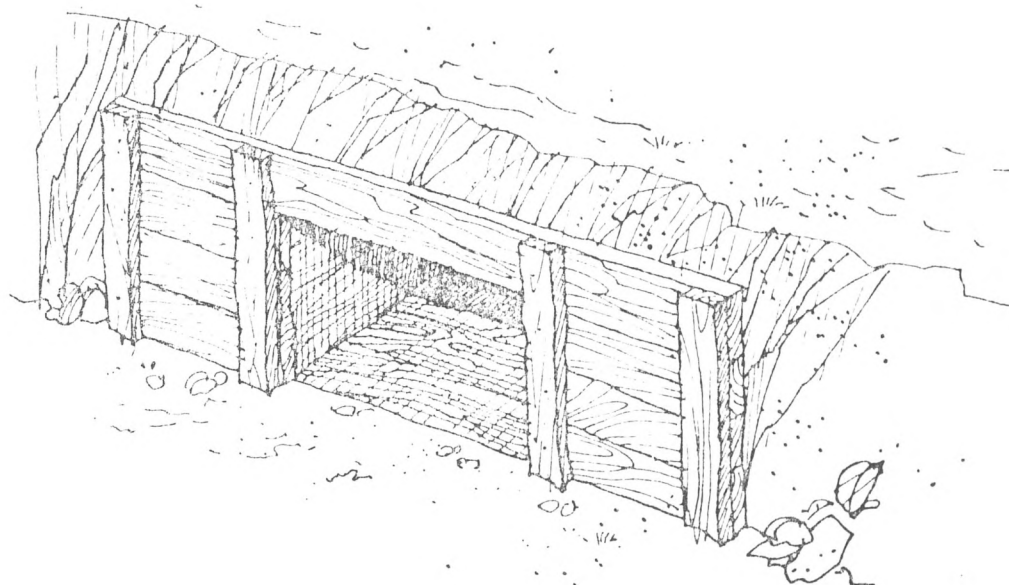


FIGURE 12-14b: Plank headwall

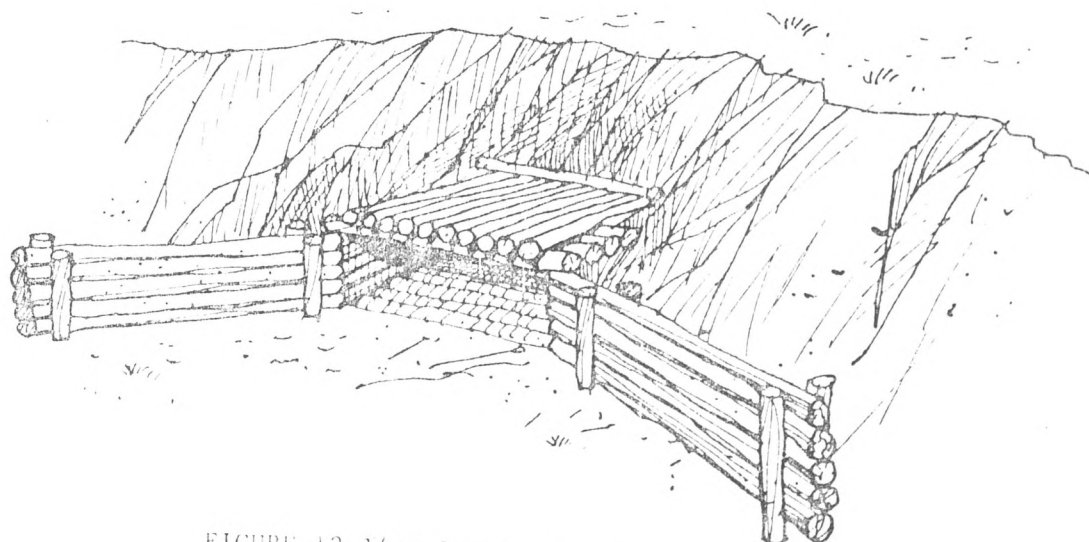


FIGURE 12-14c: Log headwall

APPENDIX 2
Expedient Culverts

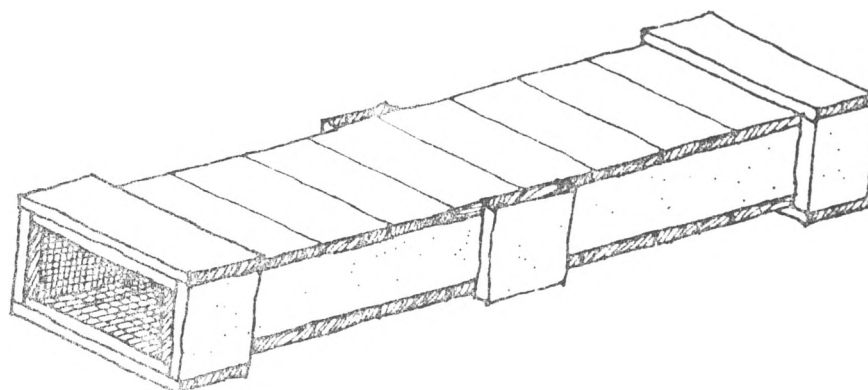


FIGURE 12-15a: Wooden Box Culvert (single)

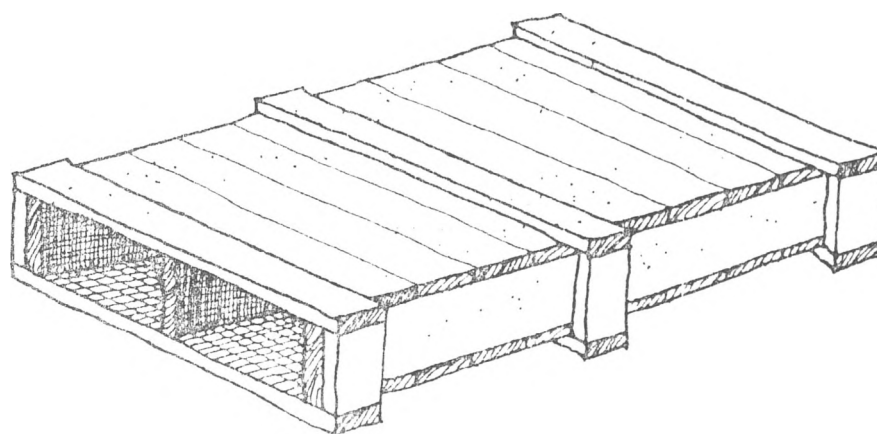


FIGURE 12-15b: Wooden Box Culvert (double)

APPENDIX 2 (Cont'd.)

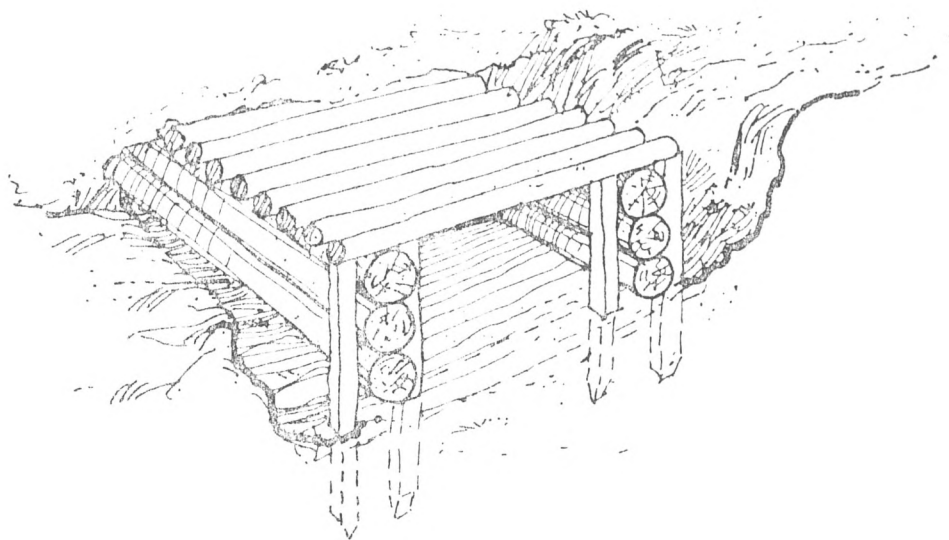


FIGURE 12-15c: Log Box Culvert

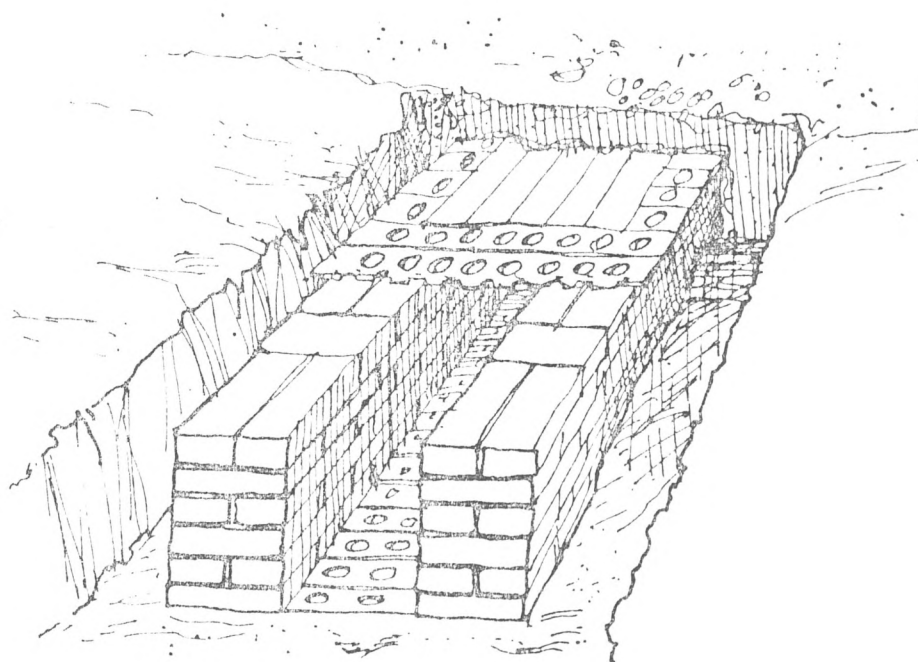


FIGURE 12-15d: Brick and Iron Grate Culvert

APPENDIX D

FAMILY HOUSEHOLD SURVEY FORM

Questions:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

1. Time living at this place (in months):

2. Total living here:
 adult males
 adult females
 children >5 yrs.
 children <5 yrs.

3. Children born last 5 years?
 Number alive now
 Number died
 how long ago?
 age at death?

Cause of death?
 a. Cough
 b. Diarrhea
 c. Fever
 d. Measles
 e. Nutrition Problems
 f. Wounds (Trauma)
 g. Other (list)

4. Current illness of children <5
 a. Cough
 b. Diarrhea
 c. Fever
 d. Measles
 e. Nutrition Problems
 f. Wounds (Trauma)
 g. Other (list)

5. Arm Circumference of children >1 - <5 yrs.
 Red
 Yellow
 Green

6. How many children <5 are attending a supplementary feeding program?

APPENDIX E

Social Change and Lugbara Subsistence Agriculture in West Nile District

Virginia Lee Barnes Dean

The Lugbara people live in West Nile District of Uganda and the contiguous area of Zaire. Their traditional territory straddles the gentle continental divide of Africa and consists of a rolling plateau which varies in elevation from about 1000 to 1500 metres. The plateau is drained by small streams which flow into larger streams which in West Nile District eventually flow eastward into the Nile but in Zaire find their way into the Congo River. The year is divided into two main seasons: the dry season, from December until early April, and the rainy season, from April to November. During the dry season there are occasionally short rains in February called "grass rains" because they provide much needed grazing for Lugbara cattle; the rainy season is also biphasic with a drier period during the middle. The plateau supports scrub savannah vegetation and the occasional large groves of trees which have grown up around the graves of Lugbara ancestors. The people live in mud-walled, circular and thatch-roofed houses which are clustered on the landscape and surrounded by cultivated and fallow fields and outlying bush. Houses are situated near water sources and as often as possible near granite outcroppings which are used for threshing grain and other activities involved in food preparation.

The Lugbara traditionally lived in dispersed patrilineages headed by an elder who was the previous elder's oldest male child by his first wife.¹ The residential group was governed by the elder and the other senior male heads of households in the patrilineage. Marriage was patrilocal, with a very abrupt transition for a girl from the status of daughter to the status of wife. Perhaps for this reason Lugbara men, and Lugbara society in general, have two very different conceptions of women. Women as sisters were treated as equals and were expected to be emotionally close to their siblings; women as wives were considered creatures of nature rather than of culture and were said to be "behind" their husbands (who were often much older than their wives because of their need to postpone marriage until they had accumulated bridewealth). Wives were responsible for the feeding and reproduction of their husband's lineage but were not socially fully incorpo-

¹For thorough background material on the Lugbara people and their territory, see Middleton (1960 and 1965). I carried out the original research reported here in 1972-73.

rated into it. When women became menopausal they were said to be "like men" and might often return to their own patrilineage, sometimes to acquire considerable political and ritual power.

The brief description of traditional Lugbara social organisation given above provides the context for an examination of the traditional agricultural system and the changes which have occurred since the Lugbara have been incorporated into the world economy.

TRADITIONAL LUGBARA AGRICULTURE

Land among the Lugbara was traditionally allocated by the elder in consultation with other male heads of household of the patrilineage. Land was allotted to a head of household according to his political acumen and the number of his dependent wives and children. Although Lugbara wives were peripheral to their husband's patrilineage in many ways, it was in the interest of Lugbara men to lobby the elders and other senior men on their wives' behalf, because Lugbara women performed about 75 percent of the agricultural labour.

Each wife needed some of three kinds of fields: "home fields" which were fertilised with ashes and manure and used to grow crops--such as the white sorghums used in the preparation of beer--which made the most demand on the soil; "outside fields" which were less intensively cultivated and were planted with staple crops such as finger millet, sorghum, sesame, beans and pigeon peas; and "fields at the water's edge" (or irrigated fields) which were independent of the dry season/rainy season cycle and were used to grow sweet potatoes, maize, sugar cane, bananas and beans (Middleton, 1965: 10-11).

Lugbara men prepared the land for planting by hoeing the field two or three times, and were responsible for sowing seeds. Women working in reciprocal work parties were responsible for all of the pre-sowing raking and seed bed preparation, and the weeding and care of the crops until they matured. Both men and women did the harvesting, after which the crops from any given field belonged to the woman who had use rights in the field for the season. Women fed their husbands and children from their granaries.

The traditional staple carbohydrate crop was finger millet (*Eleusine coracana*). Finger millet is well suited to growing conditions in West Nile. It has a small seed which dries out completely in the field before harvest and is easily stored. It tolerates dry spells in the early stages of its growth and so can be sown after the grass rains in February, germinate and still be viable without further rain until the main rains start in early April (Acland, 1971: 114-117).

Millet growing, however, is very labour intensive. Seeds are tiny and seed beds must be very carefully prepared. The first weeding, done when the seedlings are four to five inches tall, is difficult because the roots of the seedlings are delicate. Several additional weedings are necessary before harvest; when the millet has matured it must be protected in the fields from weaver birds; harvests require the participation of all available persons.

Relationships between men and women in traditional Lugbara society were complementary rather than competitive. Men were motivated to acquire good lands for their wives to cultivate, and had no alternative use for the land. Patterns in the division of labour were well established.

THE COLONIAL PERIOD

The Lugbara were spared the ravages of the slave trade, and their early contacts with the outside world were more gentle than they were for many tribal groups in Africa. Nevertheless the colonial period led to an extensive transformation of Lugbara society. The first significant contact with Europeans occurred in 1900 when Belgians began to administer the region. The people who came forward to deal with them were followers of Rembe, a Kakwa who had come into Lugbara country from the north to start a cult in response to European penetration, and were marginal members of Lugbara society; nevertheless the Belgians appointed them as "chiefs" and paid them well in cattle.² In turn these "chiefs" were able to marry well and acquire a great deal of power, which contributed to the erosion of the traditional power structure of the patrilineages.

In 1908 West Nile became part of the Sudan; in 1914 it was incorporated into Uganda and the first British administrator arrived. In the 1920s the Protestant African Inland Mission and the Catholic Verona Fathers sent missionaries to establish schools in the area. Until independence these schools provided the only Western education in the district and were important in the transmission of the Western ideas and skills necessary to enter the Ugandan governmental structure.

Events outside of West Nile also had a profound influence on the evolution of Lugbara society. With the development of cash cropping in Buganda to the south, opportunities arose for young Lugbara men to work as wage labourers for Baganda or Indian landlords. The higher areas of the Lugbara plateau were approaching a population density of 250 people per square mile (which is relatively dense for a subsistence agricultural population), and one way of easing the shortage of land was for young men to leave the district for a time.³ When they returned home with their savings they no longer had to wait their turn at the lineage's cattle herd to obtain bridewealth but instead could go out and purchase cattle, marry a wife and present themselves to lineage elders as household heads in need of land because they had dependents. In short, labour migration, like the Belgians' setting up of Rembe's followers as "chiefs" with payment in cattle, also served to lessen the traditional authority elders had over younger males within the patrilineages (see Middleton, 1965: 12-13, 90).

A third major change which took place in West Nile prior to 1973 was the development of cash cropping in the district itself. The colonial administration had been anxious to have Uganda as a whole produce a surplus, and in West Nile several different cash crops had been introduced: coffee, cotton and tobacco. Cotton only grew well at the lower altitudes of the district, in the area along the Nile, and coffee was only successful in the extreme southwestern part of the district where the elevation is around 2000 metres. But most of the central Lugbara plateau proved very suitable for tobacco farming, and in the 1950s tobacco cooperatives were set up for drying the tobacco leaves, changing tobacco growing from a small-scale effort mostly for home consumption and occasional sale under the control of the lineage elder for the lineage's cash needs, into a major enterprise. Those who

²Older Lugbara told Middleton (1965: 3-7) that the new "chiefs" started the practice of using cattle for bridewealth. Previously the Lugbara had used lumps of iron and unfinished hoes.

³Middleton (1960: 3) reports that 19 percent of adult Lugbara males were outside the district in 1951.

joined the cooperatives were mostly younger men who felt comfortable in associations not based on lineage, perhaps because of their experience as migrant labourers in southern Uganda. The development of tobacco growing made it possible for men to acquire cash income for the payment of taxes and their children's school fees (primary education was not free), and for the purchase of trade goods such as bicycles and radios, right at home in West Nile District with relative freedom from their elders' control. Meanwhile, with husbands now utilising part of the land for growing tobacco, both the amount and quality of land available to Lugbara women for other farming was diminished.

The changes just referred to took place primarily in the economic sphere as a direct result of colonial policies and had far-reaching impact on the social organisation of the Lugbara people. The compulsory growing of cassava (*Manihot esculenta*) as a famine relief crop was also significant.

It is not known when cassava was introduced to West Nile. After the widespread famine of 1942-43, however, the Lugbara were required to grow one-third of an acre of cassava per household each year (Middleton, 1965:). Since then cassava has increasingly replaced millet as the staple carbohydrate crop.

Cassava is planted as the last crop in the farming rotation and is usually intercropped with a close-spaced planting of groundnuts. The cassava crop requires almost no weeding. It is mature and ready for harvest at the same time as the millet and the other crops, but can be left in the ground unattended for another six months and harvested at any time during that period. Cassava is extremely drought resistant, and desert locusts do not eat cassava leaves. Perhaps most importantly, cassava has a higher caloric yield per acre than either sorghum or millet.

DECISION-MAKING

Lugbara women, faced with the changes in the structure of Lugbara society which have taken place over the past decades, and the resulting changes in the subsistence economy of their people, are faced every year with decisions about how much millet and sorghum and how much cassava they are going to plant. The decision-making process invariably involves a traditional preference for millet. The women say they prefer to make *anya*, their staple carbohydrate steamed bread, from millet flour alone because it tastes better and gives them strength. Cassava is thought of as a good crop because it eliminated the famines that used to plague Lugbaraland. But the women say they do not like the taste of cassava flour without millet or sorghum mixed in. When one probes a little deeper, the women say they grow cassava because millet is too much work.

Is cassava really less work to grow and prepare for cooking? Up until planting time, the labour of field preparation is essentially the same for both crops. The millet seeds are broadcast and then raked in, while cassava cuttings must be individually buried in the ground. The millet has to be weeded three times between planting and harvest, while cassava needs no weeding. The millet must be protected from weaver birds for about one week before it is harvested, then must be harvested and stored in a granary. Before it is ground into flour, millet must be threshed and winnowed. Cassava tubers, on the other hand, can be harvested when and as desired within a six-month period. The tubers are peeled and then fermented under wet leaves for three days. After the three days, the tubers (now covered with

a surprising variety of beads) are scraped and pounded with a stick to break them into lumps. Then the resulting mixture of cassava lumps is dried in the sun. When the mixture is dry it can be stored in the house or one of the granaries for several days until it is needed for grinding into flour.

The statement of Lugbara women that millet is more work to grow has as much to do with the quality and timing of the work involved as it does with the actual expenditure of energy. Millet cultivation must be done on a fairly rigid schedule, from planting to harvesting; only after harvesting can one choose when to grind it into flour. With cassava the schedule is the other way around; there is little rigidity in the tasks involved in its cultivation until it is harvested, after which it must be processed vigorously for four days. Lugbara women would rather be tied to a rigid schedule for four days in return for the flexibility cassava offers at other stages of the cultivation process.

The first reason for this preference derives from the fact that there has been an increasing tendency for wives in a polygynous household to have their own separate compounds because co-wives tend to quarrel (Middleton, 1965: 10-12). The dispersal is also related to the need to utilise land more efficiently in an area of increasing population pressure. The dispersal of household compounds also means that women are much more socially isolated than they were from each other; i.e. that in forming agricultural work groups women now have less access than they did to each other's labour. Getting together on granite outcroppings to process cassava has become one of their primary times of social interaction.

Secondly, women have had less and less access to the labour of young girls to carry and care for their infants because of the physical separation of households, and because primary school attendance has increased. It is difficult to do any of the agricultural tasks associated with millet cultivation while caring for a one- to three-year-old child. The work of cassava processing on the granite outcroppings near homesteads is much more easily integrated with infant and toddler care.

Besides the above-mentioned issues of scheduling flexibility and social networking, there is the fact that on average an acre of millet under subsistence conditions will yield from 200 to 400 kilogrammes of dried grain per acre, while an acre of cassava will yield 500 to 650 kilogrammes of dried cassava (Acland, 1971: 37, 116). Millet provides slightly more calories per unit weight (Jelliffe and associates, 1962: 41), but this is relatively insignificant when compared to the greater yield per acre of cassava.

DISCUSSION

The changes described above have had an important impact on Lugbara society and must be considered in relation to the overall welfare of the population. As Africa opened up and Uganda became an independent state the Lugbara were brought into the sphere of influence of both the national economy and the world economy. The development of tobacco cash cropping and the related increasing reliance on cassava as a staple crop has nutritional implications of far-reaching significance, especially for very young children.

In 1961 a team from Makerere Medical School headed by D. R. Jelliffe undertook a general survey of child health and nutrition among the Lugbara, and the nutritional content of Lugbara food (Jelliffe and associates, 1961: 41).

They found that by eighteen months of age over half the children were eating mostly adult food, and that by two years of age most children were on an essentially adult diet supplemented by breast milk for the 41 percent who were still nursing. Many of the children were anaemic, almost 50 percent had positive malaria smears, and most were quite retarded in growth in comparison with other Ugandan populations.

In 1973 a sample of twenty-six families from all over Lugbaraland were interviewed about their crops and their children's diets.⁴ Every family listed cassava as a main crop; only 30 percent listed millet or sorghum as a main crop. Only five families did not list millet or sorghum as a constituent of their child's staple food. One family reported making millet gruel--traditionally fed to weaning children and to pregnant mothers for breakfast--for their children. All families reported eating legumes daily. Seven families reported eating meat or fish between once a week and once a month; the rest, but for one, ate meat or fish less often than once a month.⁵

The traditional Lugbara staples--millet, sesame and beans--were combined in a diet that was nourishing and well balanced. Millet and sesame are both high in iron content, an asset in an area where anaemia (whether from malaria, hookworm or some other cause) is widespread. Both crops are also high in calcium, making them an ideal weaning food in a milkless culture (the Lugbara do not milk their cows). The traditional diet was also adequate in protein.⁶

Unfortunately, if the trend of substituting cassava for millet and sorghum continues, it is likely that a deterioration in the adequacy of the diets of the Lugbara, particularly the diets of children, will also occur.

The taste conservatism of the Lugbara people has so far led them to continue growing millet even though cassava is more productive and involves a more comfortable kind and amount of labour input, and even though the growing of cash crops in the area continues to be encouraged. But the population of West Nile District doubled between 1950 and 1973, and there is no doubt that the pressures which led to change in traditional cropping patterns will continue.

Cassava originated in the New World, but Africa now produces more cassava than any other continent. Where cash crops have disturbed traditional cropping systems, cassava has often filled the gap in food production. Its productivity, however, could be a mixed blessing for the Lugbara in the long run.

⁴The families were the matched controls for a case-control study of children with Burkitt's lymphoma, a cancer of childhood occurring in the Lugbara area.

⁵This agrees with Middleton's statement that meat was an unimportant part of the diet of the Lugbara people (Middleton, 1965, p. 7).

⁶While millet is deficient in the amino acid lysine and sesame is deficient in both isoleucine and lysine, beans are rich in lysine and only moderately deficient in isoleucine. Millet is 6 percent protein, cassava only 1 to 2 percent protein.

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